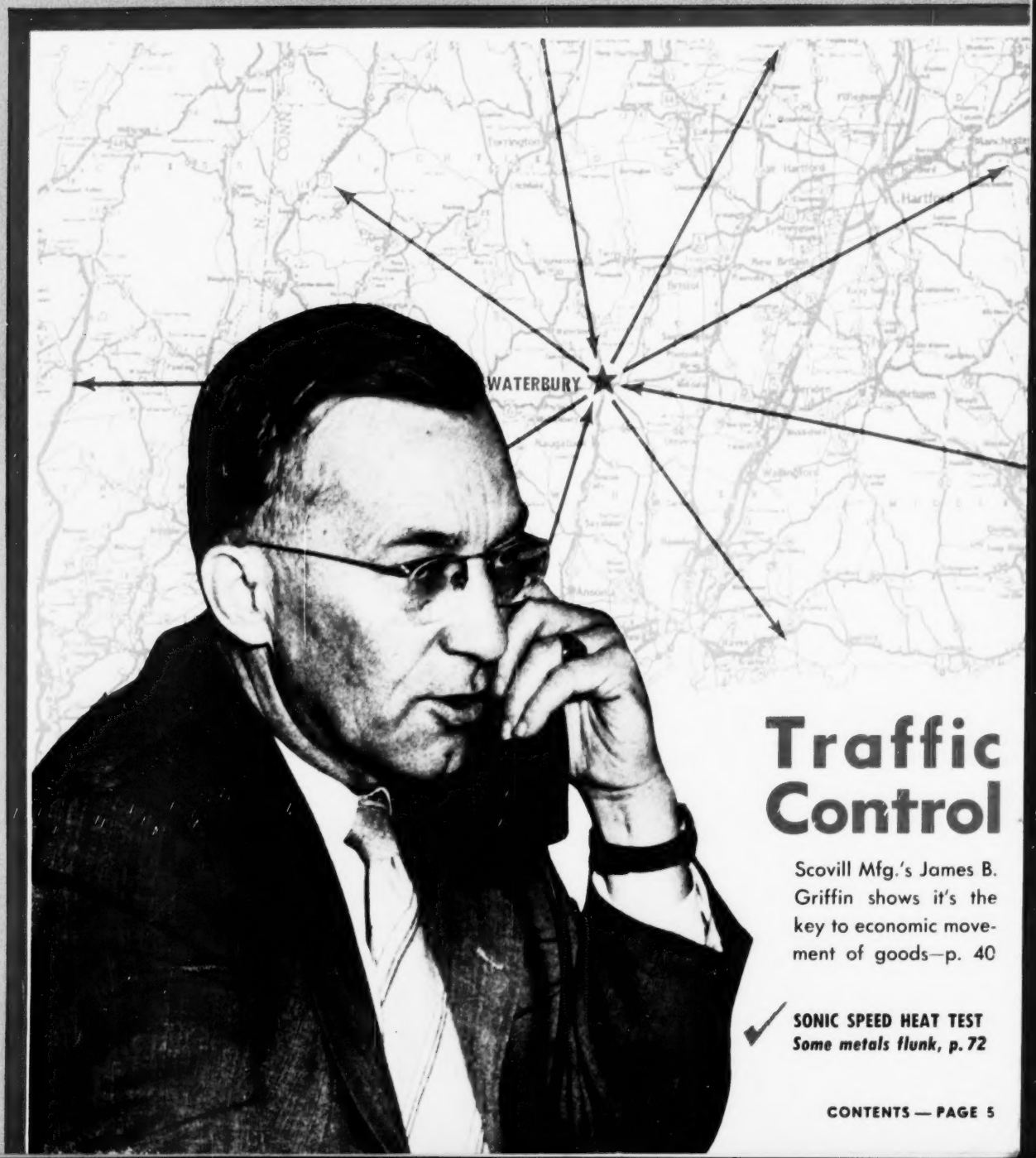
AUGUST 31, 1953

STEEL

THE WEEKLY MAGAZINE OF METALWORKING



Traffic Control

Scovill Mfg.'s James B. Griffin shows it's the key to economic movement of goods—p. 40

✓ **SONIC SPEED HEAT TEST**
Some metals flunk, p. 72

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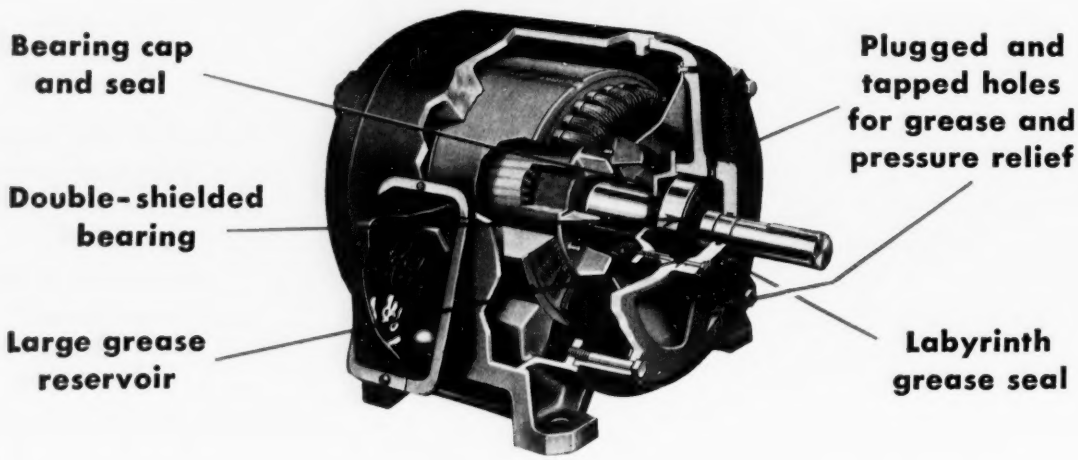
Here Are Facts You Should Know About Electric Motor Bearings

An ideal motor bearing would operate for indefinitely long periods under all types of conditions without requiring any attention whatever. However, in the opinion of our engineers, such a bearing and its attendant lubricant are not yet available on the commercial market. Consequently, bearings for many types of operations, particularly where overloading, extreme temperature ranges and chemical and dirt laden atmospheres are involved, require special lubricants or regular lubrication schedules.

Of course, bearings suitable for many kinds of operation under normal conditions can be built to require no attention for very long periods — usually several years. Allis-Chalmers can supply sealed bearings in all frame sizes through 505 on short delivery and without extra cost for applications of this type.


Bearing cap and seal
Double-shielded bearing
Large grease reservoir
Plugged and tapped holes for grease and pressure relief
Labyrinth grease seal

Which is the Best Design for *Your* Application?

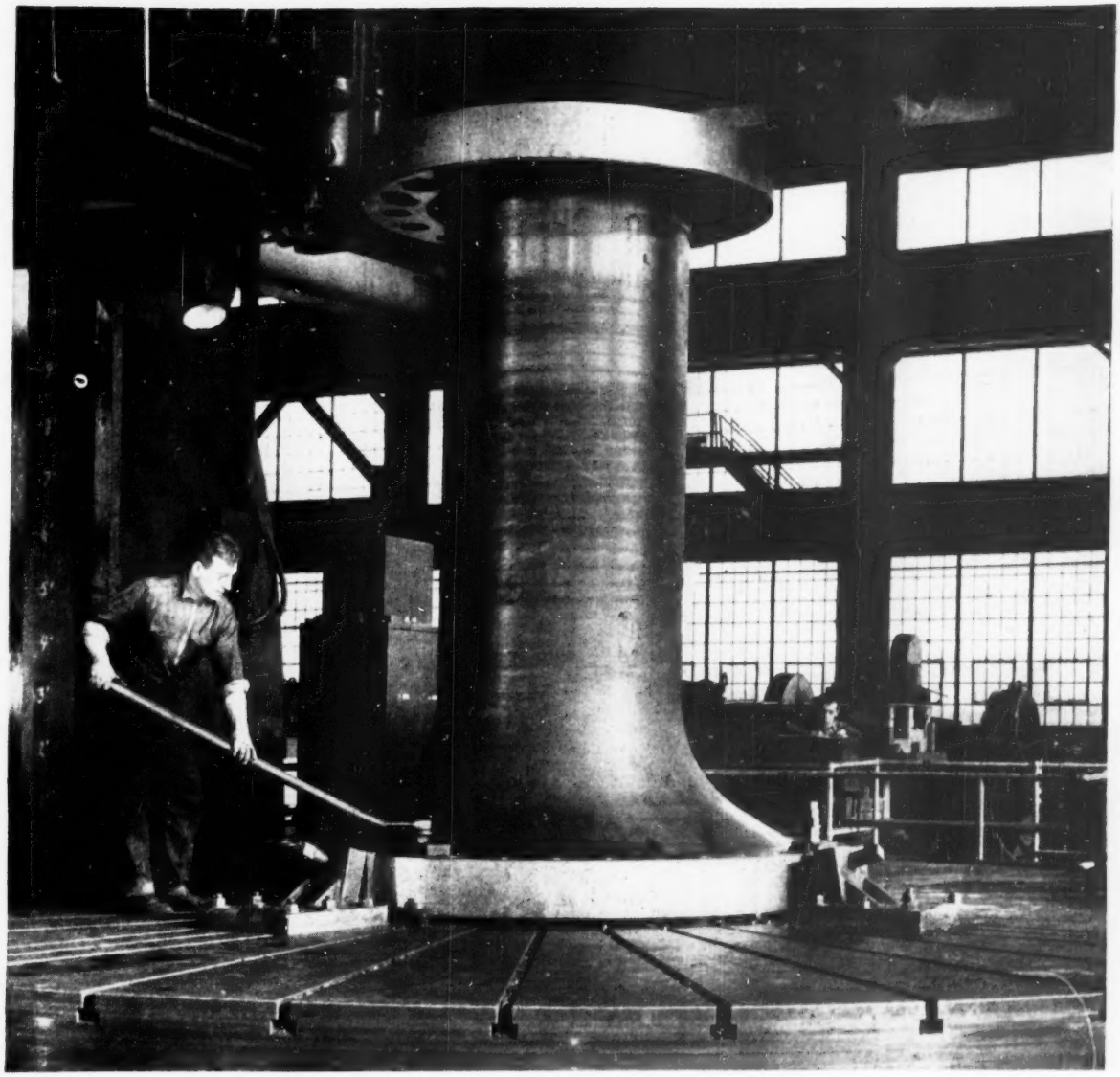
We believe that the design used in standard Allis-Chalmers drip-proof, tefc and explosion-proof motors represents the best design for most industrial users.

The Allis-Chalmers standard design consists of a prelubricated, double-shielded bearing mounted in the end housing with a generous grease reservoir. Plugged and tapped holes are provided for grease and for pressure relief. Under normal operating conditions, this design will operate as long without attention as any other type of bearing in use today. But where difficult operating conditions make relubrication desirable, it can be done as part of the normal lubricating-routine without dismantling the motor.

The large grease reservoir and shielded bearing design assure that grease lost from the bearing due to high operating temperatures or other causes will be replaced automatically.

For further information on bearing design and other features of Allis-Chalmers motors, call your nearby Allis-Chalmers District Office or Authorized Distributor. A-4130

ALLIS-CHALMERS



TO HELP MIGHTY COLUMBIA RIVER BRING POWER TO PACIFIC NORTHWEST

This 38-ton forged shaft is one of several that Bethlehem is supplying for the hydroelectric plant at McNary Dam, on the Columbia River. Waters controlled by the $280,000,000 dam will provide the power for a generating system with a capacity of nearly a million kilowatts.

As shown here, the steel shaft is about to be removed from a vertical boring mill at one of the Bethlehem plants. It is a massive thing, almost 11 ft long and nearly 4 ft in diameter at the smallest point. The larger of the two flanges has a diameter of 8 ft, 9 in.

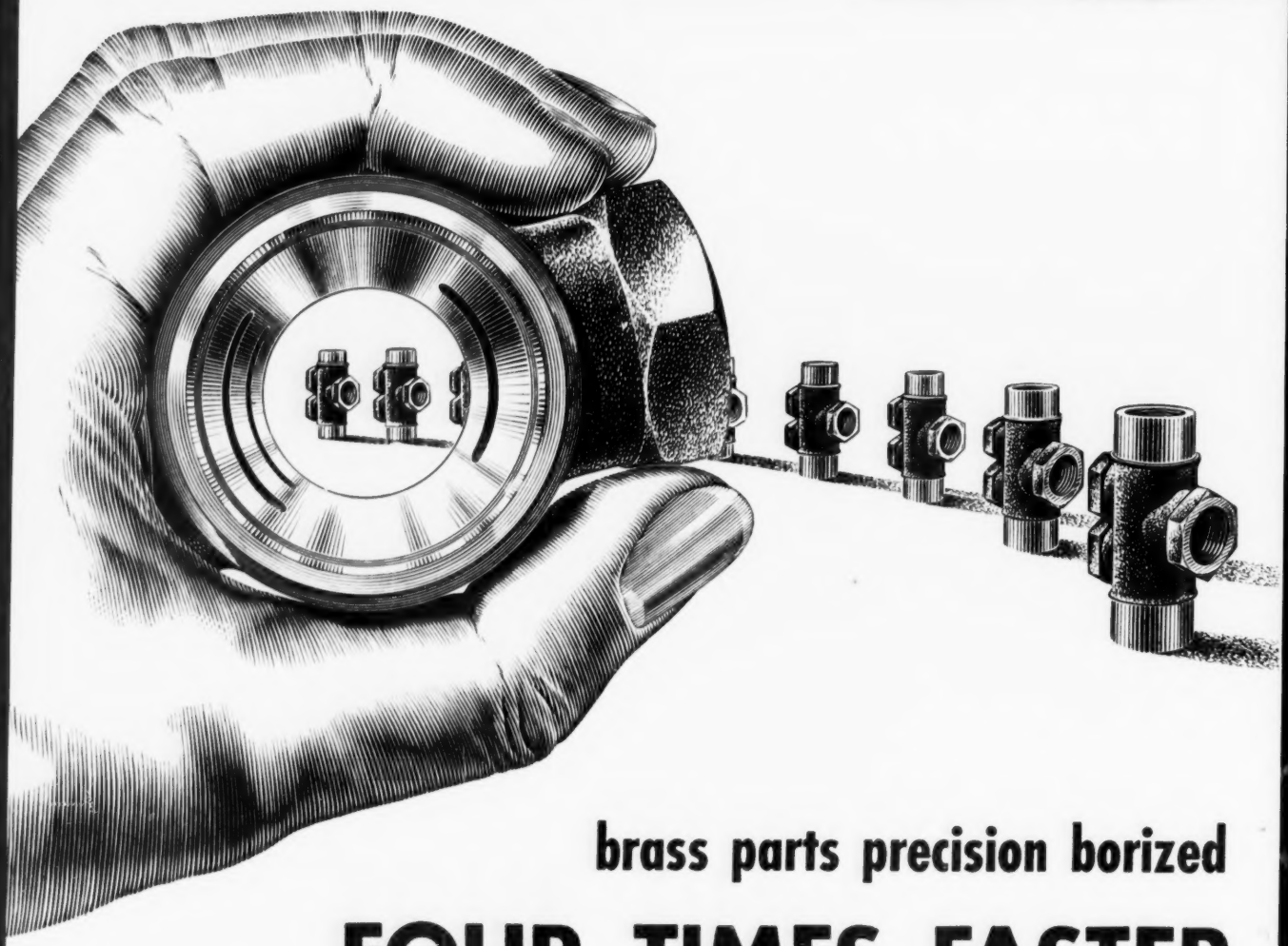
The customer's order specified that all finish-machining except the bolt holes be done by Bethlehem.

The big forging is a good example of the heavyweights we are frequently called upon to handle. In contrast, we produce forgings as small as a child's finger. Some of the biggest and some of the tiniest forgings made can often be seen at the same time in the Bethlehem shops.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL



brass parts precision borized

FOUR TIMES FASTER

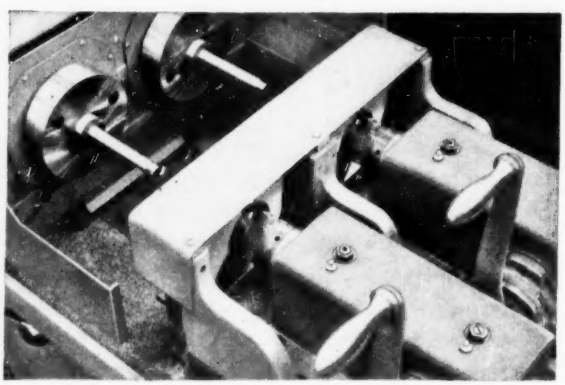
. . . with higher accuracy and better finish, too!

● No wonder this Heald customer is pleased.

Compared to the method previously used, his new Bore-Matic has multiplied air-valve production *four times!*

This one machine, a Model 124 Bore-Matic, finishes 15 different sizes and types of valve bodies. What's more, borizing of the rough-reamed parts produces a bore that's straight, round and within .0002″ for size. Scrap losses have dropped to the vanishing point. And the new machine is far easier to operate, requiring less operator training.

Remember—when it comes to precision finishing, it pays to come to Heald.



Internal and Rotary Surface Grinding Machines and Bore-Matics

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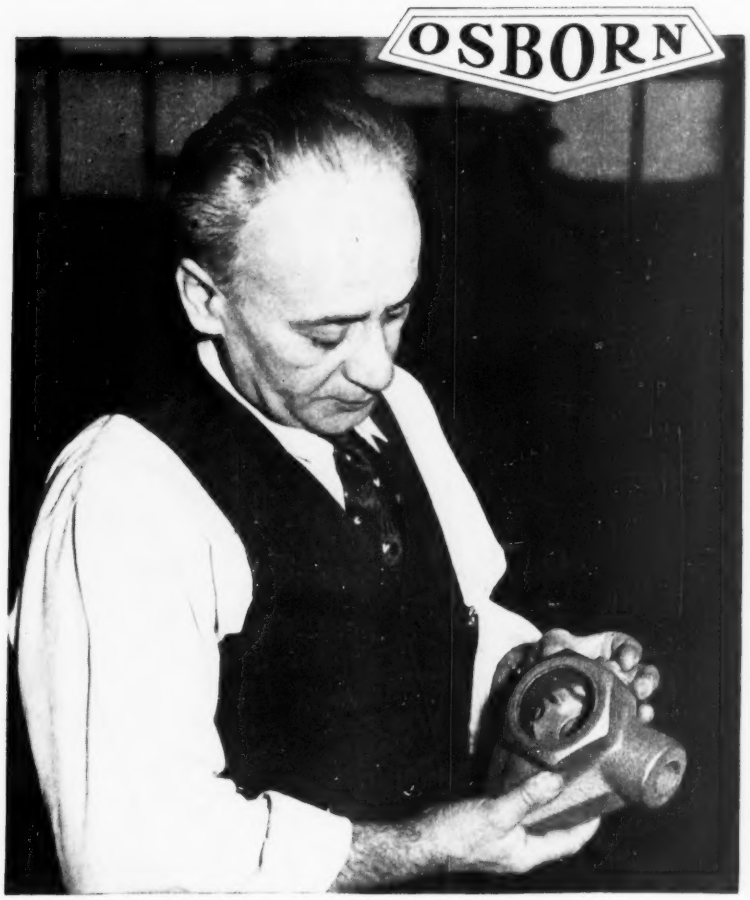
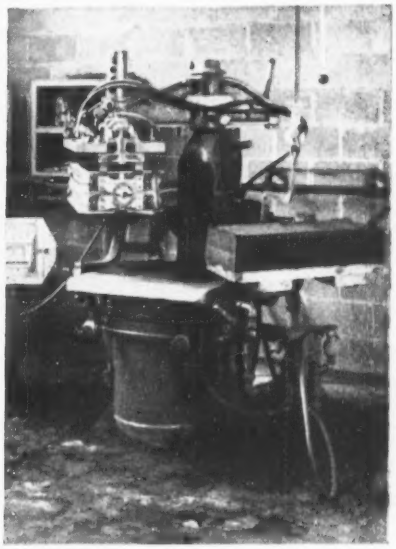


STEPS UP PRODUCTION 20 TO 90 MOLDS A DAY



SAVES ONE OPERATOR

Here Osborn's ROTA-LIFT has increased production 9 times. Formerly 20 molds a day were made by one molder and one helper . . . now 90 molds are produced a day with one molder and no helper.

How accurate castings can cut your machining costs

SIMPLY by improving the accuracy . . . the quality of your foundry molds through use of modern molding and core blowing machines, it is possible to reduce machining costs three ways:

1. Accurate castings are uniform in size . . . less metal is needed for finishing.

2. Less time is needed to load uniform castings in chucks or holding fixtures. Extra grinding operations on oversized castings are eliminated.

3. Uniformity of machine rammed molds and cores reduce scrap casting losses. Machines make molds and cores faster, too.

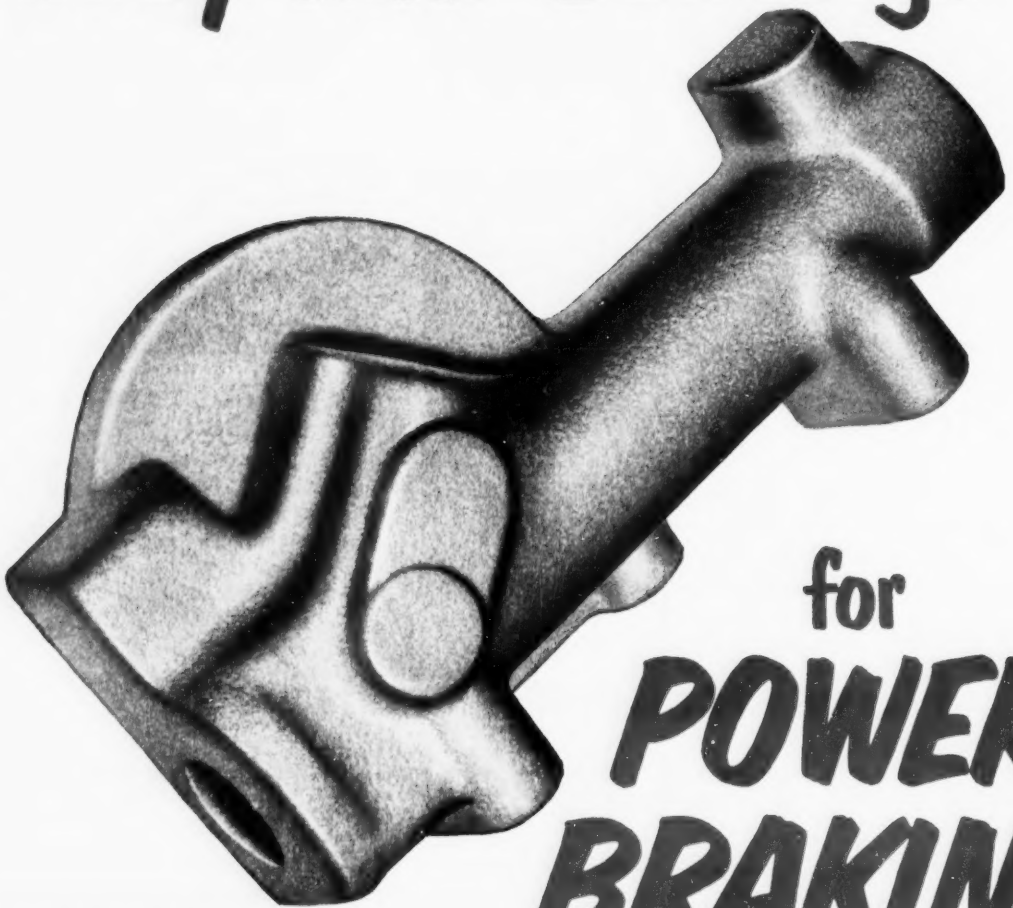
INVESTIGATE NOW. Have an Osborn foundry-trained molding specialist analyze your operations. You can profit from his long experience in improving the quality of castings . . . cutting foundry molding costs. Write *The Osborn Manufacturing Company, Dept. EE-9. 5401 Hamilton Avenue, Cleveland 14, Ohio.*

Serving the Foundry Industry for Over 43 Years

Osborn Molding Machines

MOLDING MACHINES . . . CORE BLOWERS . . . INDUSTRIAL BRUSHES

Eaton Permanent Mold Gray Iron Castings—



for POWER BRAKING

Send for your free copy of the 32-page illustrated booklet: "The Eaton Permanent Mold Foundry." It tells the story of Permanent Mold Castings and takes you on a picture-tour of the Eaton Foundry at Vassar, Michigan.

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This Week in Metalworking

STEEL

Vol. 133 No. 9 August 31, 1953

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STREET_____
CITY_____ ZONE____ STATE_____
X-74

behind the scenes

Dear Mr. Johnston:

Opened our mail this a.m. and found this letter:

"Dear Shrdlu:

"Oh no you don't. Not after what you did to my office. The nerve of you. I want to say right here and now that it's far too late for any such arbitrary and categorical statements such as you printed in the August 17 issue in answer to your Polynesian Puzzler.

"No sir, brother, at this advanced and confused stage of the proceedings, you'd better tell how and by what dubious process of reasoning you arrive at two possible answers. This may seem like routine to you, but I've got to live with these people, and let me tell you, it's going to take some irrefutable logic on your part to make *two* answers stick. H--l, around here we can't even make one answer stick."

Very truly yours,
V. M. JOHNSTON
Controller
APPALACHIAN COALS, INC.

Now, here comes the sticky logic. The solution to the problem depends on the fact that every native, whether Arbu or Bosnin, must always reply to a question about his caste by saying that he is an Arbu. If he really is an Arbu he will speak the truth and say so; if he is actually a Bosnin, he will lie and say he's an Arbu.

Hence, Abl said he was an Arbu (which he must whether he is actually one or not) then Bsl and Crl can be either Bosnin or Arbu depending upon how faithfully they report Abl.

Anyone for Chess?

Chess is a game about which we know very little. King, queen, pawn and rook are merely characters out of *Alice in Wonderland* to us. There are a few mental giants on our staff, however, and a lot of you out there, too, who get keen delight out of manipulating carved pieces on the squared strategy board.

We here at the paper mill have a group of chess enthusiasts we like to call the Sagacious Six. Each day comes lunch time a board appears almost magically on the desk of Jack Gernhard, *Machine Design* circulation manager. Like infantrymen converging on an objective come Pat Dwyer and Dan Funk, staff artists, George Auner, statistician, Newman Ladabouche, research manager, and Bob Mentall of the production department.

The Sagacious Six play a peculiar brand of chess. The idea, as we get it, is for two of the fellows to play and for the others to kibitz. They set up unusual problems and then join their collective heads in working out effective solutions.

Our purpose in mentioning this here is to pit the skills of our Sagacious Six against the field. You set up the problems; they'll try to figure out how to beat them.

It should be fun. Send your chess setups to Shrdlu. We'll see that the boys get them and then publish the problem and solutions in this column for all chess men to see.

More About Mangoes —

More correct answers to that difficult mango problem of August 10. These came from a couple of "every weekers" in the persons of L. D. Rice of Quality Control Department at Timken Roller Bearing Co. in Canton, O., and A. J. Havlicek and L. A. Dingwell, metallurgists at Kropp Forge Co. in Chicago.

A Marital Problem!

Three men—Arthur, Bernard and Charles—with their wives—Ann, Barbara and Cynthia—make some purchases. When their shopping is finished each finds that the average cost in dollars of the articles he or she has purchased is equal to the number of his or her purchases. Arthur has bought 23 more articles than Barbara and Bernard has bought 11 more than Ann. Each husband has spent $63 more than his wife. Who is the husband of whom?

Shrdlu

(Metalworking Outlook—Page 21)

Wellman will build it

Special Cranes
Coke Pushers
Gas Producer Plants
Ore Bridges
Charging Machines
Forging Manipulators
Gas Flue Systems
Gas Reversing Valves
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Wellman Combined Coke Pusher, Coal Leveler and Door Extractor in operation at Bethlehem Steel's Lackawanna Plant.

● Many of the world's most modern byproduct coke oven plants are Wellman equipped. The Wellman Engineering Company's more than half-century experience in building heavy machinery guarantees sound design and expert construction. Wellman equipment provides peak economy, maximum safety and trouble-free performance under a wide variety of operating conditions.

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STANOIL
TRADE MARK
Industrial Oil

Cutting hydraulic maintenance on...

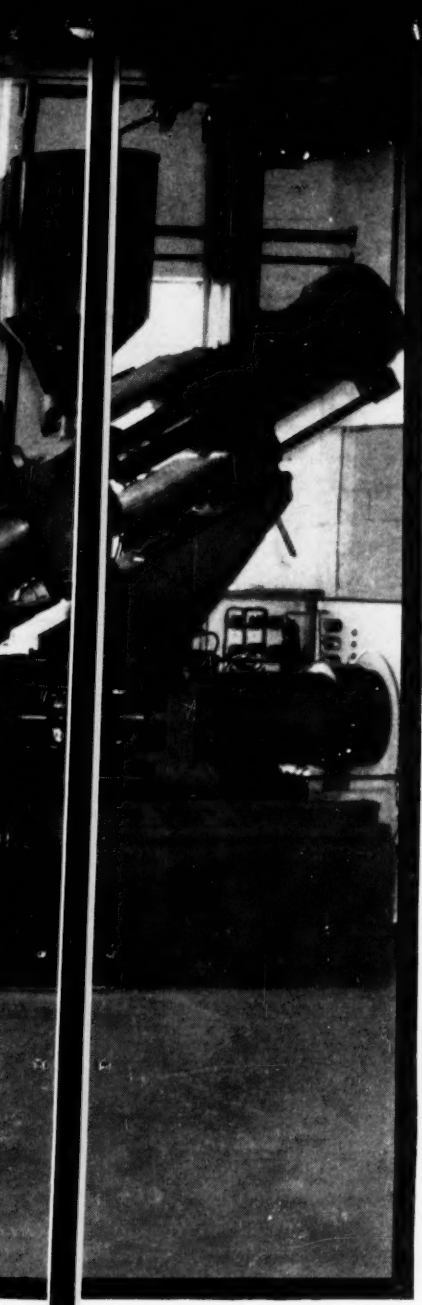
operation big squeeze

• Shown above is one of the world's largest injection molding machines, recently installed by the General Machine Tool and Die Company, Walled Lake, Michigan. The machine has a 1500-ton clamp, a plasticizing capacity of more than 300 pounds of material per hour, and can accommodate molds as large as 4 x 6 ft. in size.

The General Machine Tool and Die Company, a pioneer of the injection molding process of plastic forming, uses the new giant injection machine to produce refrigerator door panels. Forming one entire panel per injection, this Operation "Big Squeeze" pioneers another important advance in injection molding.

In the hydraulic system of this great machine, as in ten other injection presses operated by the General Machine Tool and Die Company, STANOIL Industrial Oil has played a significant role. Withstanding severe conditions of heat and pressure, STANOIL has kept hydraulic systems clean and permitted efficient operation of units at all times. Maintenance has been kept to a minimum.

Find how STANOIL can benefit you by discussing this multi-purpose oil with the Standard Oil lubrication specialist serving your section of the Midwest. Phone your local Standard Oil office. Standard Oil Company, 910 S. Michigan Ave., Chicago 80, Ill.



What's YOUR problem?

W. C. Spain, of Standard Oil's Detroit office, has worked closely with the General Machine Tool and Die Company to assure the economical and reliable hydraulic oil performance vital to the operation of this company's injection presses.

Like all Standard Oil lubrication specialists, he has a broad background of practical experience plus thorough training in Standard's own lubrication engineering schools. And like all lubrication specialists, his on-the-job assistance is always available to the industries in the immediate area he serves. He is one of a corps of experienced men who make their headquarters wherever industry is located throughout the Midwest.

For help with your problem, call for the services of your Standard Oil lubrication specialist. Phone your local Standard Oil office.

Send for this booklet

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(INDIANA)

You'll find the means to significant savings in this booklet. It describes the important qualities of STANOIL Industrial Oil and the resultant benefits which have made this multi-purpose oil the choice of midwest manufacturers for a host of lubricating jobs. Discover how STANOIL will give you superior protection through its unique combination of six outstanding characteristics, including high stability and effective rust prevention. Find how STANOIL can simplify stock, storage, and inventory in your plant by replacing special-purpose oils in a wide variety of equipment. Ask the Standard lubrication specialist from your nearby Standard Oil office for this booklet, or write: Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

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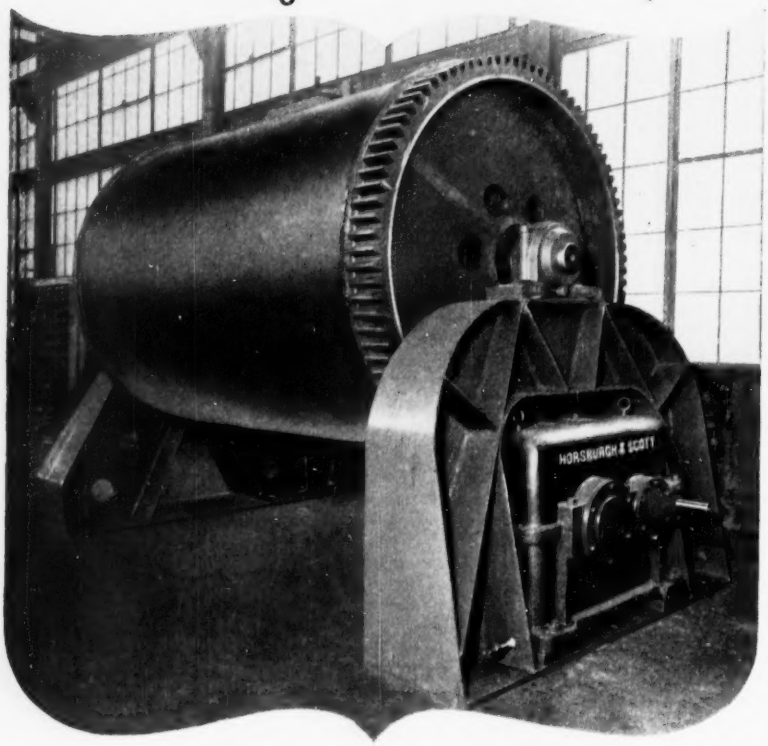
save maintenance and space with

Greater safety



• Since 1940 the Horsburgh & Scott Herringbone Speed Reducer illustrated above...driving an Epworth Manufacturing Company Ball Mill in a large paint manufacturing plant... has been in operation with *no* repairs necessary. The service is severe with heavy starting load and the machine operates continuously for periods of 24 to 72 hours. As compared with the old drives the results are: greatly reduced maintenance and space... greater safety is also an important feature. H & S Speed Reducers offer many savings and advantages throughout the range of industry...it will pay you to investigate.

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Send note on Company Letterhead for Speed Reducer Catalog 46

LETTERS
TO THE EDITORS

Cold Extrusion Comes of Age

Kindly advise what you would charge for 1000 reprints of your story on cold extrusion, "Cold Extrusion of Steel . . . A Military Hero in Civilian Garb" (July 27, p. 78).

Rudolph Shlifer
secretary
Jac-Lar Products Co. Inc.
Philadelphia

• *Quotations are being sent.—ED.*

I have read with much interest your article on cold extrusion of steel and would appreciate very much getting a copy for my files.

C. D. Cooper
local engineer
American Car & Foundry Co.
Berwick, Pa.

• *It's on the way.—ED.*

I read with interest your account on cold extrusion in the July 27 issue of STEEL and feel I must take exception to the principles and methods set forth. I have found that, with either ferrous or nonferrous, any metal which can be successfully cold headed to diameters can be extruded at room temperature without resort to special tool steels, lubrication or radius and in support of this statement, I offer the enclosed samples as visible proof.

I am also aware that still better results could be had through the use of phosphate coating, carbide formers, etc., but the specimens submitted were all produced in quantity, wherein either die or punch was plain carbon tool steel, water hardened and the lubrication soluble oil, quite thin.

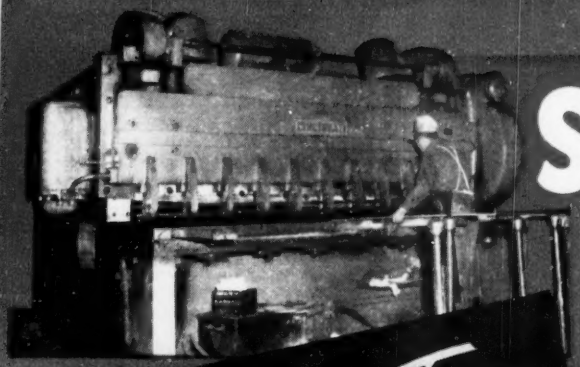
The screw plug blanks are produced from a ball at the rate of 90 per minute, carbon steel ring, high-speed steel punch. The small splined No. 10 set screw blank is made from a ball using the rolled splined stock, as used in making the wrenches, for the punch. The cylinders were produced over 30 years ago on a Manville $\frac{3}{8}$-in. solid die header, the wire cut off and extruded at 45 per minute, carbon steel die, high-speed punch. Wire feed-rolls in machine oil, lubricate the wire in conventional manner.

The firing pin is made from a ball, S.A.E. 1010 cadmium plated, no other lubricant employed. This was produced for the armed forces and during 1944 was supplied to them at the rate of 200 million daily.

Arthur C. Mantle
P.O. Box 84
Trumbull, Conn.

• *The samples of your work show that you are no stranger to the cold extrusion process.* STEEL's *article was written largely for the person who had never*

Please turn to page 12



SHEARING and FORMING a GIANT

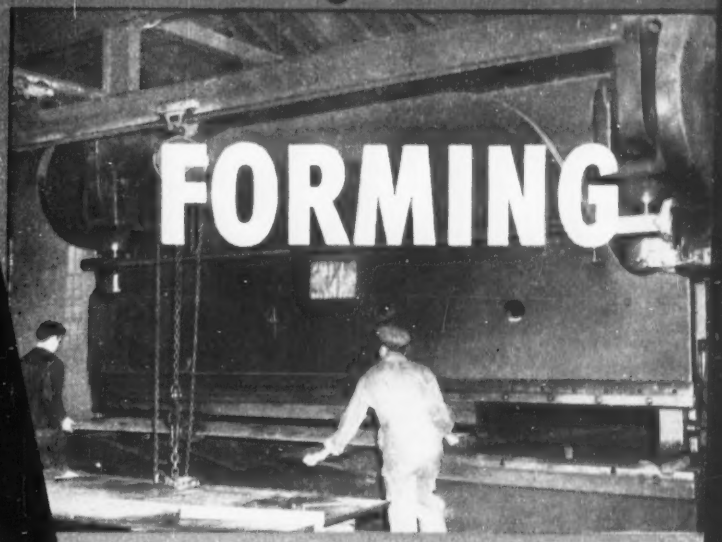
The Story of a Team

Steel sheets for these Giant Marion Shovels are formed with great accuracy on a Cincinnati 210 Series Brake. The blanks sheared square and true on a Cincinnati 100 Series Shear—contribute to this accurate forming that speeds and simplifies assembly.

This Cincinnati Brake, with 16 feet of die surface, is forming 3/8" plate into lower frame pieces. The one inch capacity shear is cutting 3/4" plates for the shovel platform or upper deck.

Save time, save money with this dependable Cincinnati Team.

Write for Shear Catalog S-6 and Brake Catalog B-4.



The Marion 5561, World's Largest Mobile Land Product, with a 45 cubic yard shovel. Photos—Courtesy of Marion Power Shovel Co., Marion, Ohio.

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

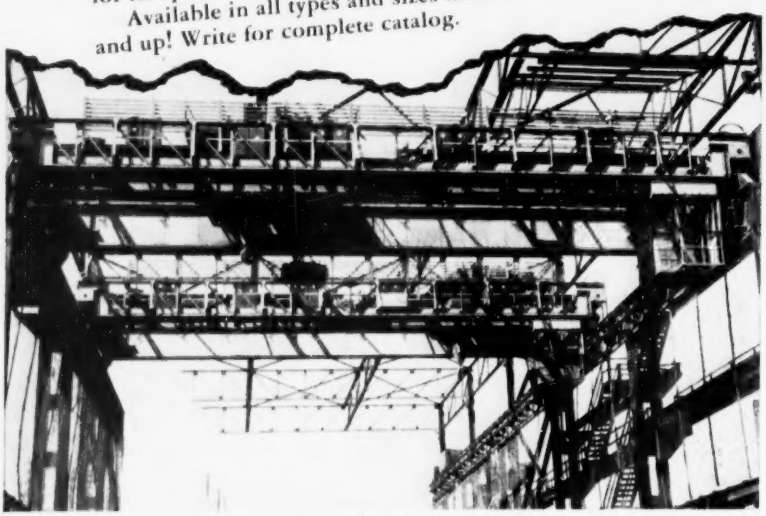
30 ton 89 foot span BEDFORD Magnet Crane over the slab yard in the new Portsmouth, Ohio, mill. Other new Bedford Cranes have been installed in the open hearth stock house, blooming mill slab yard, cinder yard and the mould yard.

DETROIT STEEL INSTALLS SEVEN NEW BEDFORDS

More and more steel men are comparing—and choosing Bedford Cranes for advanced design—for precision engineering—for safe, smooth, dependable performance.

Backed by more than 50 years of specialized crane building experience—each Bedford Crane is custom engineered for its specific application.

Available in all types and sizes from 5 tons to 350 tons—and up! Write for complete catalog.



Two 30 ton 75 foot span BEDFORD Magnet Cranes with 15 ton bucket auxiliaries over the cinder yard—used as skull cracker cranes in the Portsmouth, Ohio, mill.

BEDFORD CRANES SERVICE

STEEL MILL CRANES

BEDFORD

BEDFORD FOUNDRY & MACHINE COMPANY, INC. · BEDFORD, INDIANA

LETTERS

Concluded from page 10

done any cold extruding and who was interested in finding out more about it and more about how to use it. With that in mind, it was believed appropriate to begin with substantial safety factors in every phase. That s why the article points out the desirability of heavy punch and die structures, the advisability of phosphate coating, etc. Once a manufacturer, like yourself, has gained experience in and knowledge of cold extruding as applied to steel, he can then determine what limitations are best for his job from a practical and economic standpoint.—ED.

I think you did an excellent job in the article on cold extrusion. The question has been raised whether or not the

illustration on p. 82 is of a one-piece rocket or an assembly of warhead and base as two separate pieces by some mechanical means. If it is not a one-piece rocket, your picture might mislead others as it did me.

Weber deVore
manager, ordnance division
Heintz Mfg. Co.
Philadelphia

• *You're right. The photograph if of a two-piece rocket, an assembly of the nose and rocket body. Only the nose is cold extruded.—ED.*

Set Up in Vacuum Metallurgy

I was very interested in your article on "Vacuum Metallurgy" (June 29, p. 88).

At present I am considering the adoption of vacuum melting for the production of alloy steel precision castings, but unfortunately, I have been unable so far to find any detailed information on the subject.

As I believe vacuum melting has to some extent been developed in America, I take the liberty of writing to ask if you would be good enough to advise me where I could obtain sufficient details to assist me in developing the necessary plant and procedure.

R. A. Montgomery
51 Mount Park Rd.
London, England

• *Write to F. J. Stokes Machine Co., Philadelphia; Ajax Electrothermic Corp., Trenton, N. J.; National Research Corp., Cambridge, Mass., and Consolidated Engineering Corp., Vacuum Processing Division, Rochester.—ED.*

We all enjoyed reading your article on vacuum metallurgy. I think you are to be congratulated on a very fine survey of the techniques used in vacuum melting and of the applications for vacuum melted materials.

Gordon Kiddoo
director
Development Department
National Research Corp.
Cambridge, Mass.

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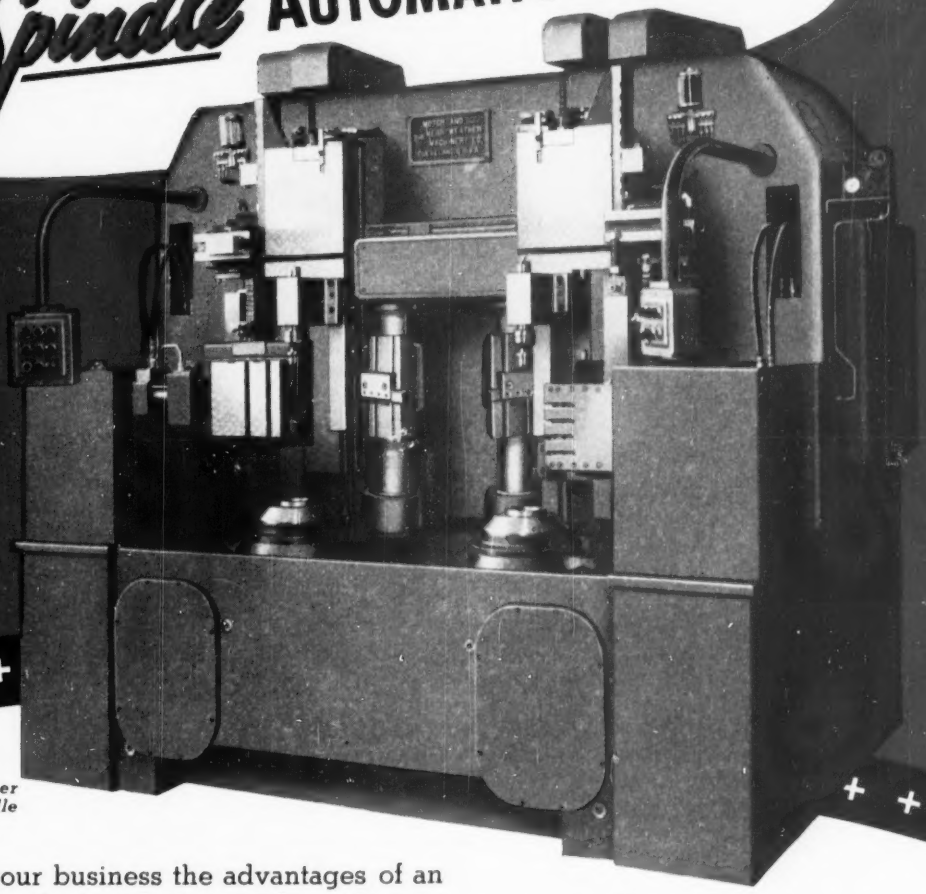
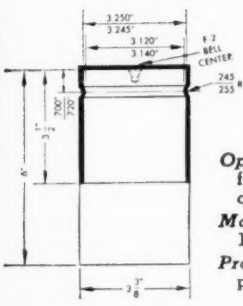
GET PLUS ACCURACY!

GET PLUS PROFITS!



Motch & Merryweather VTBF-12 Twin Spindle Automatic Lathe.

Command for your business the advantages of an automatic turning-boring-facing cycle with precision – *plus* the value of *twin yet independent* spindles – *plus* the value of vertical facility for handling parts. These machines are accurate, rugged, and dependable, yet simple to set up.

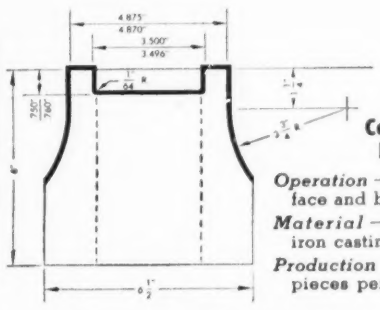


Case Study No. 96

Operation – Turn, face, groove and center drill.

Material – SAE 1335 annealed.

Production – 124 pieces per hour.



Case Study No. 124

Operation – Turn, face and bore.

Material – Gray iron casting.

Production – 60 pieces per hour.

STANDARD SPECIFICATIONS

Chuck diameter	10"
Swing	12" dia.
Work height: chucking	12"
between centers	16"
Turning slide, vertical feed	14"
Boring slide, vertical feed	14"
Facing slide, horizontal swing	6"

★ ★ ★

Individual, selective hydraulic feed for each slide. . . . Special variations to meet individual requirements. . . . Simple contours by cam-operated tools. . . . Tracer control can be added.

Manufactured by — THE MOTCH & MERRYWEATHER MACHINERY CO. —

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Builders of Circular Sawing Equipment, Production Milling, Turning and Special Machines

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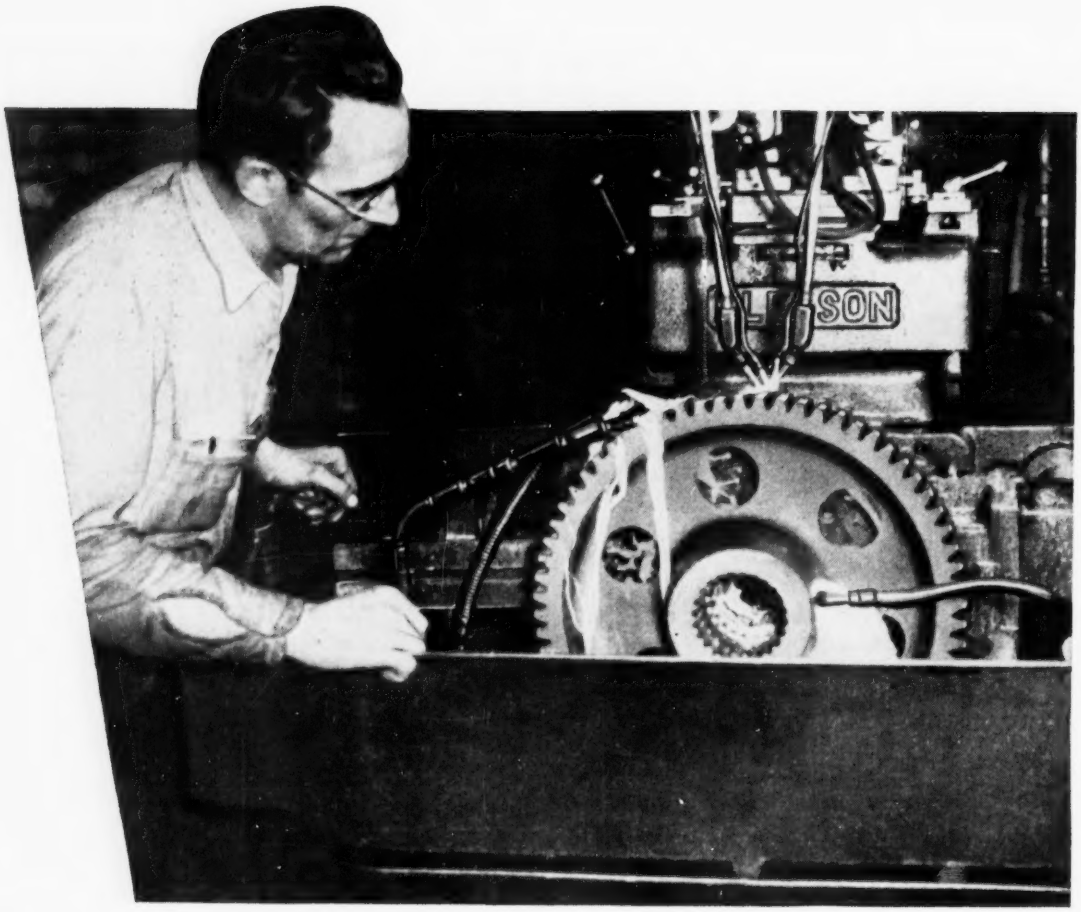

flame-hardening + + +

. . . a process for hardening ferrous metal surfaces.
It permits the hardening of gear teeth, thus increasing wearability,
while the gear body's ductility, toughness and
resistance to impact are undisturbed.

- At BRAD FOOTE, flame-hardening, and every other operation from design to shipment of finished gears, is done in our own plant—by our own skilled workers. No one shares our responsibility.

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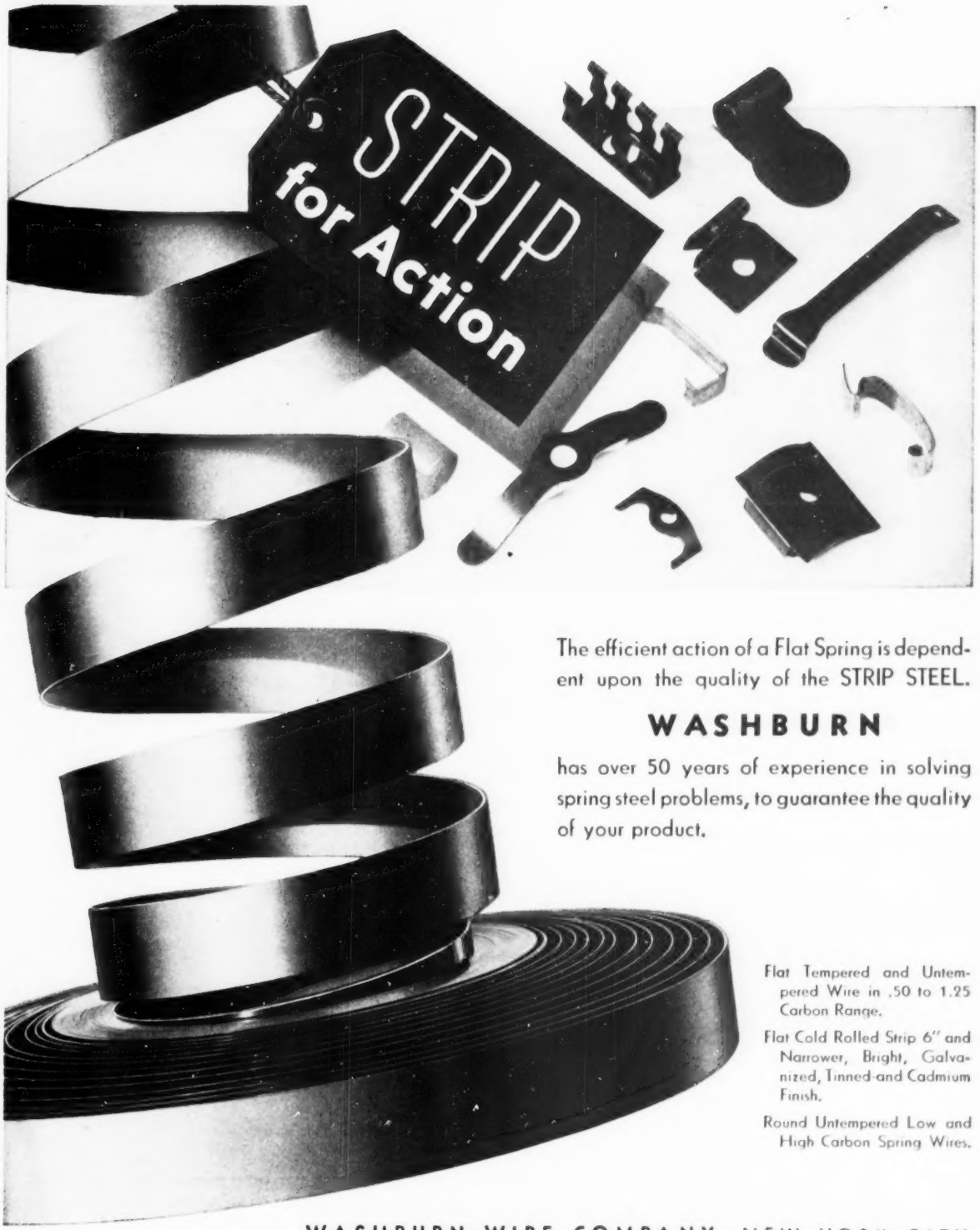

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Flat Cold Rolled Strip 6" and Narrower, Bright, Galvanized, Tinned and Cadmium Finish.

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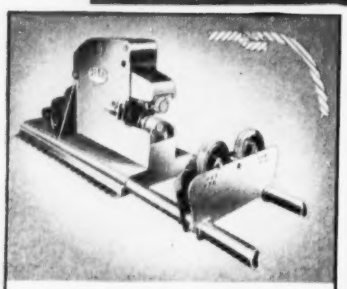
- TURNING ROLLS
- AUTOMATIC WELDING FIXTURES



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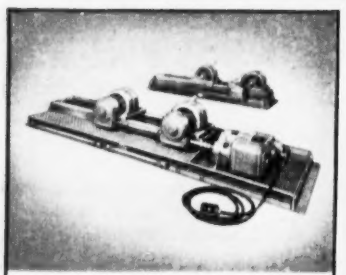
  M-4—3/16 to 7/16" plate



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- ★ Rugged, all-steel construction
- ★ Built-in silent worm gear drive

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STEEL

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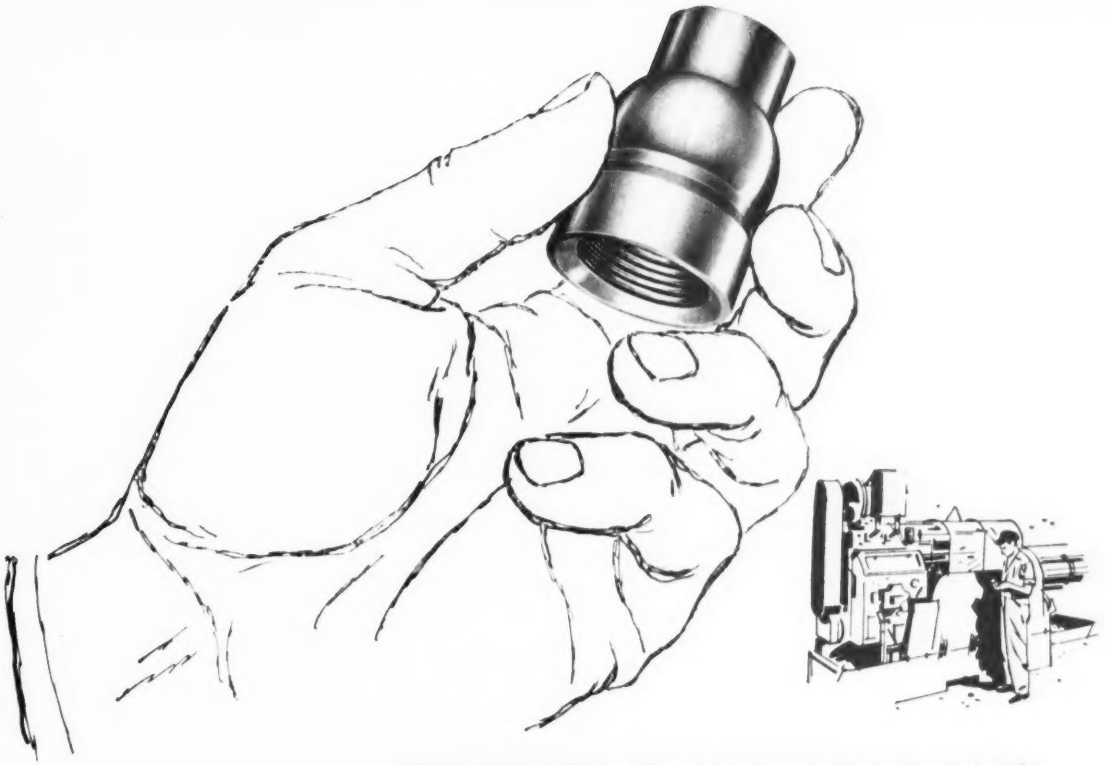

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● That's why we make this test part in our own plant at Massillon, Ohio. It embodies the six most common automatic operations. By studying it, we discover how to make Union Drawn Steels even better for automatics. More free-machining. More profitable for you. When the part has served its purpose for research, we scrap it.

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And just to make sure you get the most out of the Union Drawn Steels you buy, one of our metallurgists or machining engineers will be glad to talk to your set-up man. Swapping hints on tool angles, heavier feeds and speeds, they can often come up with the best ways to run Union Cold Drawn Steels. When shall we call?

6 HELPFUL MANUALS

filled with how-to-do-it information and data to help you use Union Cold Drawn Steels. Write for "Union Drawn Pocket Library."

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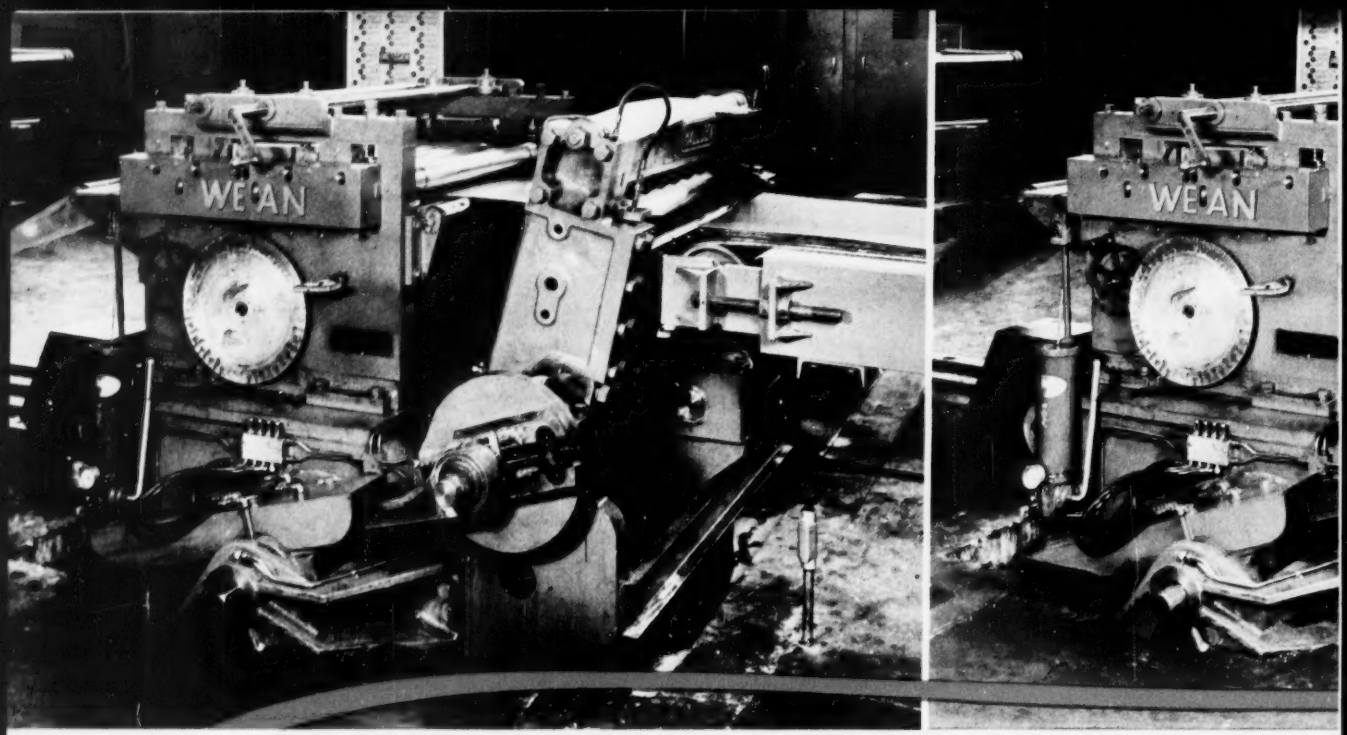
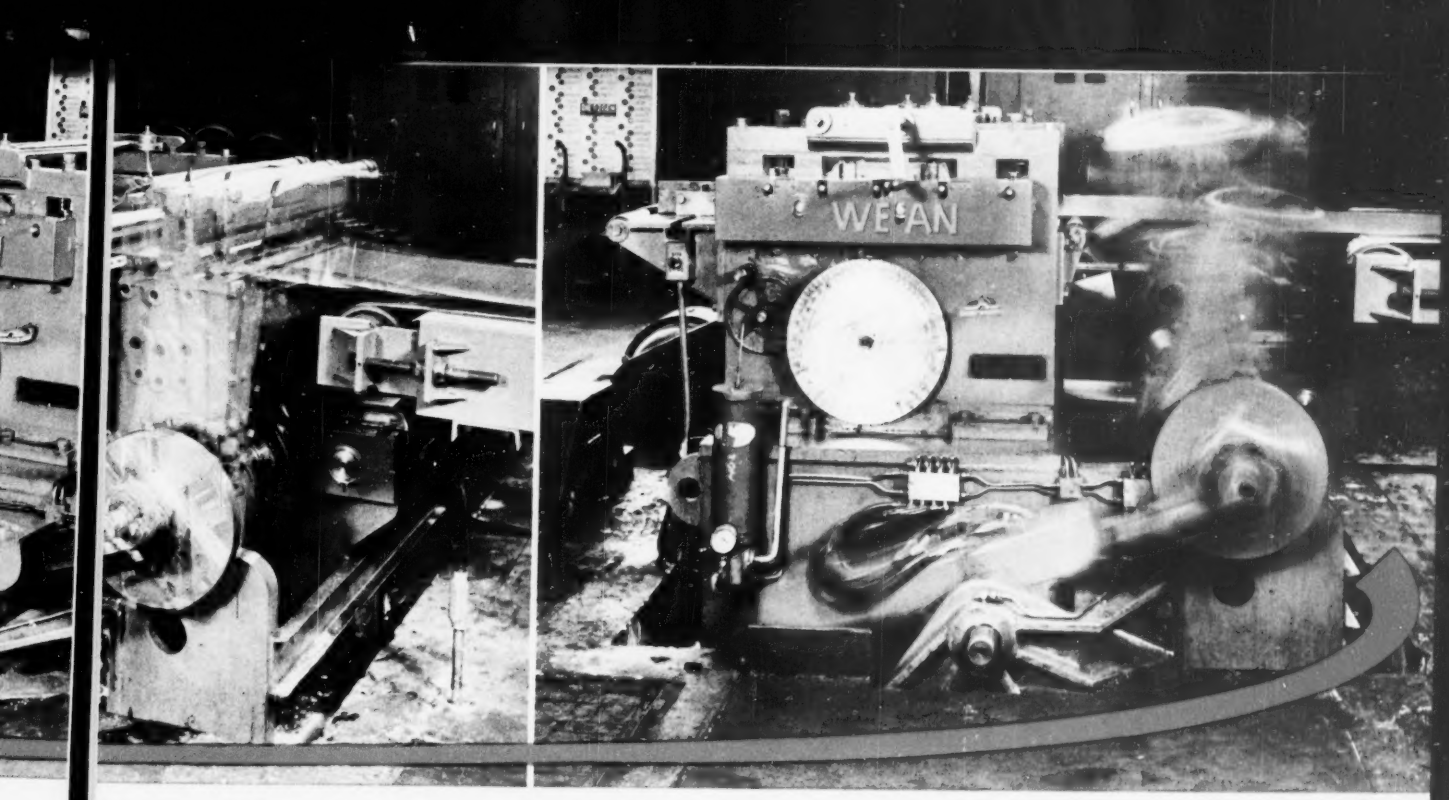


Here's the Amazing That Makes 100 Cuts Per Minute

Saves Bulk Steel Users $20 a Ton

Wean salesmen have a quick and painless method for actually showing you, using your own figures, how, by purchasing steel in coil form, you can save in the neighborhood of $20 per ton on your steel costs. This is an offer you can't afford to overlook. If your plant is situated in an area where a Wean Line is operating we invite you to see it in operation ... talk with the people who operate it ... and we're sure you'll want this great system in your own plant.



e to Resquared Tolerance

One-hundred cuts per minute to resquared tolerances . . . that's what users of the amazing new Wean Equipment Flying Shear and Slitting System are getting. That's why, if you are using steel in sheet form, it's important to you to get all the facts.

By purchasing steel in coil form you eliminate all the expensive mill extras—that sometimes amount to more than $1.00 per hundred weight. You reduce considerably both the personnel required to handle and inventory large steel stocks and the space needed to store various cut sizes of steel of the same gauge and analysis.

And this Wean System provides you with faster production. Here is a shear line that will cut to tolerance at the rate of 100 times per minute. Measure this against your present squaring-to-multiples rate and you'll quickly see how a single Wean line can keep a bank of high speed presses in constant operation.

NOW! THESE SAVINGS ARE EVEN MORE IMPORTANT

Rising costs are forcing steel makers to further increase the cost of extras. Some of these raises are already in effect. In the face of such action the Wean slitting and shearing line should now be even more important to you.

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COMBINATION SLITTING and SHEARING SYSTEMS

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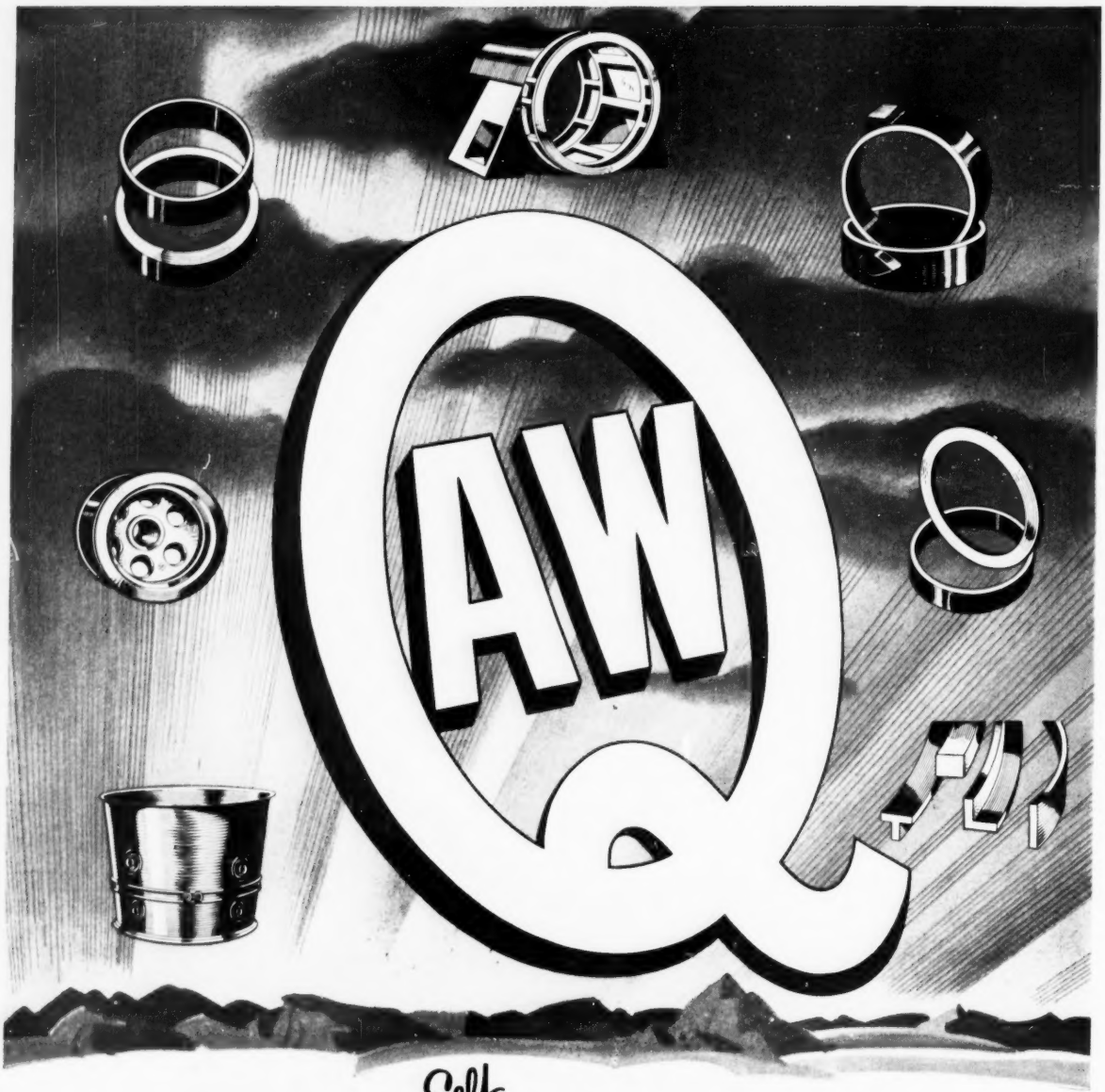

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STEEL
August 31, 1953

Metalworking Outlook

Toward a Balance

Last week scrap prices fell, more steel controls were eased and the ingot rate slid to 94.5 per cent of capacity, equal to the lowest level this year. Those happenings indicate that the long-awaited balance between supply and demand in steel is not far off. In fact, it's here in wire, buttweld pipe, tin plate, small cold-finished bars and a few other products. Still tight are heavy plates, wide-flange beams and large-size seamless tubing. Export controls have just been relaxed on 70 steel products.

Third Round Aluminum Expansion?

The U.S. won't decide on whether to back a third round of aluminum expansion to boost capacity 214,000 tons until October at the earliest. The delay is caused by the Defense department which has yet to complete its study of military goals. Directly affected will be Olin Industries Inc. and Wheland Co. Both firms have asked the government for special financial assistance to construct aluminum plants. Indirectly affected will be other tentative expansion plans, notably that of Aluminum Co. of America (p. 34) which has just been awarded a certificate of necessity for a proposed $29-million expansion at Davenport, Iowa.

Copper for the Stockpile

The Chilean copper the government is to buy for the stockpile will cost $42 million at New York for 70,000 tons at the world price of about 30 cents a pound. Late last week Washington officials agreed to make the purchase only if Chile would come down from its 36½-cent price, which that nation finally agreed to do. The settlement at the lower figure is a great relief to copper men in the U. S. (p. 102).

More Titanium for Britain

Construction has been authorized by the British government of a plant to have an annual capacity for producing 1500 tons of titanium sponge. When completed next year, the production will eliminate or sharply reduce the present drain on our insufficient sponge supplies to help take care of increasing British needs.

Prescription for Economic Health

Government planners notably Arthur F. Burns, chairman of the Council of Economic Advisers, and Walter Williams, undersecretary of commerce are busy brewing antidepression medicine. To spot depressed conditions, they will rely on business, banking, political and labor organizations to report them as and where they appear. Present thinking is that once a distressed area is identified, immediate relief would be given by placing government contracts there. To that end, procedures in awarding con-

tracts are being revised, particularly the one for placing U.S. work in labor surplus areas. The old policy of giving preference to those labor surplus areas has been suspended for the time being.

Now It's BSDA

Business Services Defense Administration is the new name for what was originally tagged Business Services Administration. The Commerce department still is shooting for Sept. 1 as the date for launching the agency to be NPA's successor. Late last week there were still legal snags, particularly regarding Justice department approval on the role to be played by industry advisory committees and councils in the operation of BSDA.

Decontrol Continues

A direction to DMS Reg. 1 to be issued soon by NPA or BSDA will authorize self-certification by defense contractors of maintenance-repair-organizational requirements. Under present conditions no difficulty is expected in obtaining such supplies and parts; hence, the anticipated action.

Big Cities Grow Bigger

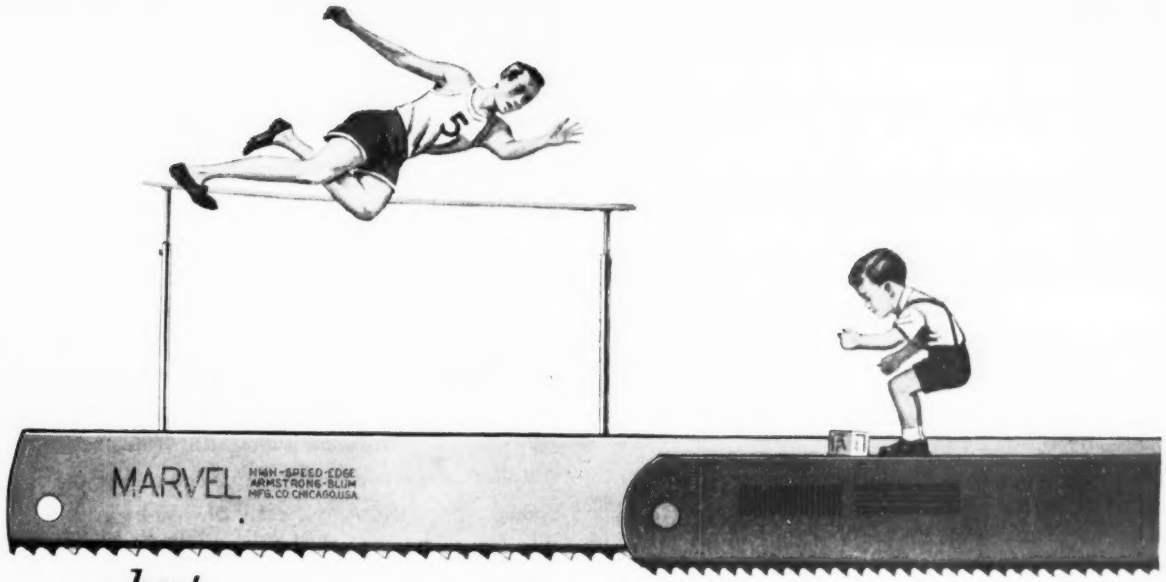
Despite all the talk about decentralization of urban areas, figures show that big cities are getting bigger. Two-thirds of our population today is urban, says Urban Land Institute, and half the nation's people live in urban areas with a population of 50,000 or more. Between 1940 and 1950, the population of urban areas having 100,000 or more people increased by more than 6 million. While there has been a lot of fringe growth around cities, says the institute, that population is still urban.

Straws in the Wind

Ford Motor Co. is going into research on gas turbine engines for possible use in automobiles . . . Those ingenious vending machine manufacturers have now come up with a coin-operated "relaxing" device that provides a gentle massage . . . On Feb. 1 the federal payroll numbered 2,556,482; on July 1, 2,486,600; by next July 1, it will carry 2,376,482 names . . . The new Small Business Administration not only will take over the loaning functions of Reconstruction Finance Corp., but it has also moved into its building at 811 Vermont Ave., Washington.

This Week in Metalworking

Where are the apprentices? (p. 29) . . . Bethlehem Steel Co. aims at a bigger role in the structural market (p. 31) . . . Refractory makers are finding new customers for their products (p. 32) . . . Aircraft components in World War I comprised about 15 per cent of the cost of an average airplane; they account for more than 50 per cent of the cost now (p. 33) . . . Republic Steel Corp. is moving mountains in Alabama (p. 34) . . . A new antitrust enforcement policy is shaping up (p. 35) . . . Russia is entering the world auto market (p. 39) . . . Traffic control is big business (p. 40).



. . . but

Experience Cannot be Copied

More than a quarter-century ago MARVEL invented and basically patented the MARVEL High-Speed-Edge Hack Saw Blade—the UNBREAKABLE blade that increased hack sawing efficiency many-fold.

Every MARVEL Hack Saw Blade ever sold has been of that basic welded high-speed-edge construction, with constant improvements from year to year, as EXPERIENCE augmented the "know-how" . . .

MARVEL is not "tied" to any single source of steel supply, and has always used the best high speed steels that became available from time to time as metallurgy progressed. When-as-and-if finer steels are developed—and are proven commercially practical for welded-edge hack saw blades—MARVEL will use them, regardless of cost or source . . .

There is only one genuine MARVEL High-Speed-Edge! All other "composite" or "welded-edge" hack saw blades are merely flattering attempts to imitate — without the "know-how" of MARVEL EXPERIENCE . . .

Insist upon *genuine* MARVEL High-Speed-Edge when buying hack saw blades—and be SAFE, for you can depend upon MARVEL. They have been "tested", "pre-tested", and "re-tested" by thousands of users for more than a quarter-century!

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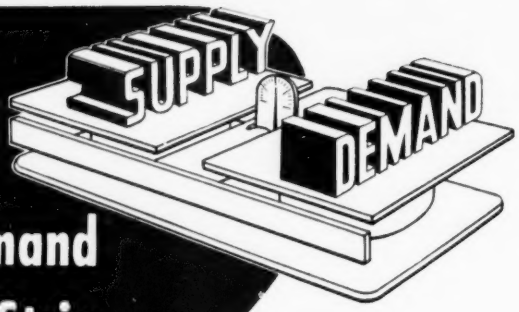
Better Machines–Better Blades

ARMSTRONG-BLUM MFG. CO. · 5700 Bloomingdale Ave. · Chicago 39, U. S. A.

Steel plentiful or scarce . . . Reliance *Job-Fitting* Service helps you balance your demand for Sheet and Strip



There has been much talk about the "coming" supply-demand balance in steel.

Actually, the talk concerns expanded steel-making capacity and the possibility that "one of these days" it may ***over-balance*** demand. Whether it will and when, is anyone's guess.

Meanwhile, this much is sure. No matter what "conditions-in-general" may be, there will always be individual users with ***under-balanced*** supplies of specific items for specific jobs at specific times. . . . And there'll always be your warehouse suppliers to help you correct your own supply-demand balance from day-to-day.

And when it's sheet or strip you need—to get a job started or finished faster or to keep it running—try Reliance.

DEPENDABLE DAN
T.M. REG. U.S. PAT. OFF.

Says Dependable Dan about Reliance JOB-FITTING Idea:

- It's knowing our "stuff" . . . our "feel for steel."
- It's knowing your job . . . what you expect the steel to do for you.
- It's supplying in-stock sheet and strip best suited to your immediate need.

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COLD ROLLED STEEL STRIP and FLAT WIRE
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SHEETS
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Standard and Production Sizes or Cut to Actual Working Dimensions

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Worse than in War

Some commentators have described the destruction of the Detroit Transmission Division plant of General Motors Corp. at Livonia, Mich., on Aug. 12 as the worst single-plant fire in the nation's industrial history. This is probably true. It is also quite possible that this accidental calamity was even more disastrous than any deliberate destruction of industrial facilities ever attempted by military authorities in time of war.

Shortly after the end of World War II this writer had an opportunity to inspect hundreds of bombed plants in Japan and Germany. In Japan many metalworking plants had been destroyed by incendiary bombs. In plants where the heat had been intense, machine tools were so badly warped that it was virtually impossible to restore them to use. In the Ruhr in Germany, where blockbusters instead of incendiaries were employed, the bases of machines were cracked, but not warped. A good welding job could restore a lathe, planer or boring mill to use. This was particularly true in the Krupp Works, where several hundred bombs were dropped in a single day in May in 1945.

Every bit of evidence produced thus far indicates that the accidental fire at Livonia was even more destructive than anything that a military enemy has yet contrived to inflict upon an industrial plant in wartime. This brutally true statement is a direct challenge to every designer, architect, engineer, operating executive, safety expert or other specialist who has anything to do with the planning, construction and operation of industrial plants.

Possibly in our preoccupation with the problem of achieving greater productivity we have overlooked the fact that modern mass production techniques call for the use of inflammable materials arranged in such fashion that once a fire starts there is a lightning chain reaction that is difficult to combat. Reports of the Livonia disaster refer to an almost unbelievable rapidity in the spread of fire.

It is to be hoped that in the history of the metalworking industry to be written in the future, the Livonia fire will be cited as the shocking disaster which awakened American industry to a new appreciation of the importance of fire prevention.

E. C. Shaner

EDITOR-IN-CHIEF

EXULTING IN OCTOBER: From almost every conceivable angle the Livonia fire of General Motors is "bad news." Yet, if we will lift our thoughts to a day sometime in mid-October—let us say the day when the National Metal Congress opens in Cleveland—we can con-

fidently count upon meeting scores of General Motors executives who will be cocky to the extreme. Why so exuberant?

They will be exulting over the marvelous job they will have done in restoring normal production of automatic transmissions after the Livonia fire reduced the three-year-old modern plant to ashes. Years later, these hundreds of GM employees who worked around the clock, ignoring breaks for meals, sleep and rest, will look back upon the big battle of August, 1953, as one of the most exhilarating and satisfying experiences in their lives.

There is something in an industrial calamity, and in the resultant emergency, that brings out the very best in human nature. People rise to amazing heights when the chips are down.

* * *

SPREADING THE WORK: Another aspect of the Livonia fire is deserving of attention. As soon as it was possible to do so, machine tools were removed from the plant and trucked to the original builders. The builders (p. 43) were instructed to recondition the machines, if feasible. Apparently hundreds of machine tools were subjected to heat which was intense enough to injure exposed electrical controls and wiring but not enough to warp machine bases. In cases of this kind, machines can be placed in operation in a few weeks.

Somewhat surprising is the report that jigs, fixtures, slides, pawls and other complex mechanisms which adapt a machine to a job on close tolerance parts suffered more heavily from rust and warpage. This has meant that a really sizable volume of tooling has been distributed to an unprecedentedly large number of tool and die suppliers.

* * *

SCRAP DIP PROPHETIC: For the second week in succession the price of iron and steel scrap (p. 99) has declined rather sharply. Almost from the beginning of the steel industry in this country, the news of a definite break in the price of scrap has been interpreted by astute iron and steel men as a reliable indication that the demand for steel was overtaking supply, that a buyers' market was approaching and that real and rugged competition for the buyers' favor again was imminent.

Unquestionably the weakness in scrap again is prophetic. The tension of demand is easing rapidly. Consumers are not hard pressed to "buy ahead" as they have been doing for a decade or more. It will be interesting to watch the market in the weeks ahead—when the influence and pressure of the buyer will gradually and almost imperceptibly overcome the advantage that for a decade or more has rested with the seller.

* * *

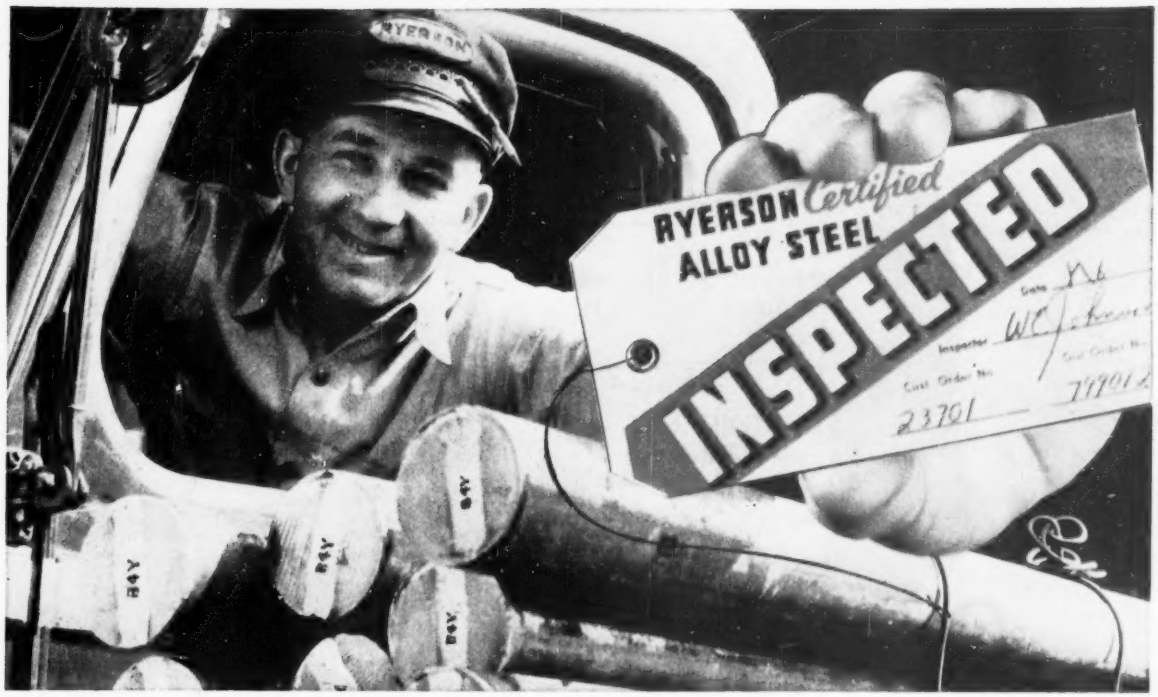
DUTCH BUY RED AUTOS: Automobile dealers in Rotterdam, Holland, received an initial shipment of 120 small Russian cars late last month. Most of them were sold immediately (p. 39) and the importers expect further monthly deliveries until 500 cars have arrived. Some observers believe that similar prestige-building shipments of low-priced Red automobiles to other non-Communist nations may well be part of a new plan of the Soviet Union's economic strategy.

If so, it is difficult to see how the U.S.S.R. can hope to become a factor of any consequence in world automobile markets for a long time. Her present annual output of about 500,000 vehicles—consisting of more trucks than cars—is far short of her own needs and those of her satellites. However, if the Dutch shipments mean Russia intends to greatly expand trade with nations outside of the Iron Curtain, they may be significant.

* * *

THE TRAFFIC MAN'S JOB: Recently Associate Editor Samuel W. Baker spent a busy day with James B. Griffin, superintendent of traffic, Scovill Mfg. Co., Waterbury, Conn. Sam's description of his visit appears on pages 40 and 41 of this issue. We believe that many executives who will take the time to read it carefully will gain a new respect for the important services which a good traffic man can render a company in the metalworking field.

Obviously he should be a part of the management team, and he should have the proper authority for his position. Thus equipped, he can save money, not only in his immediate job of directing shipping operations efficiently, but also in advising on product design, plant or warehouse location, opening new markets, packaging, product classification, inventory control and many other operations.



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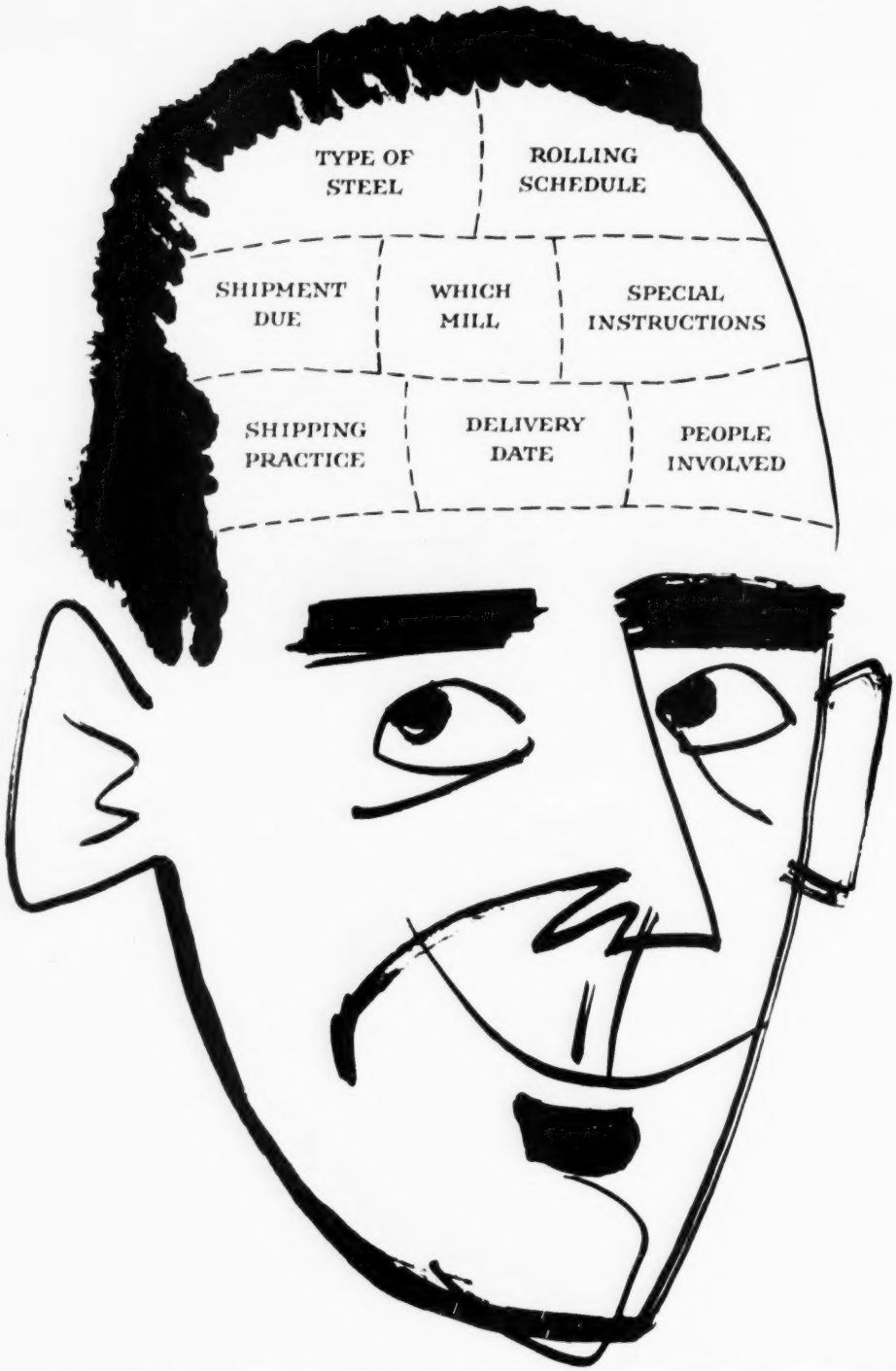

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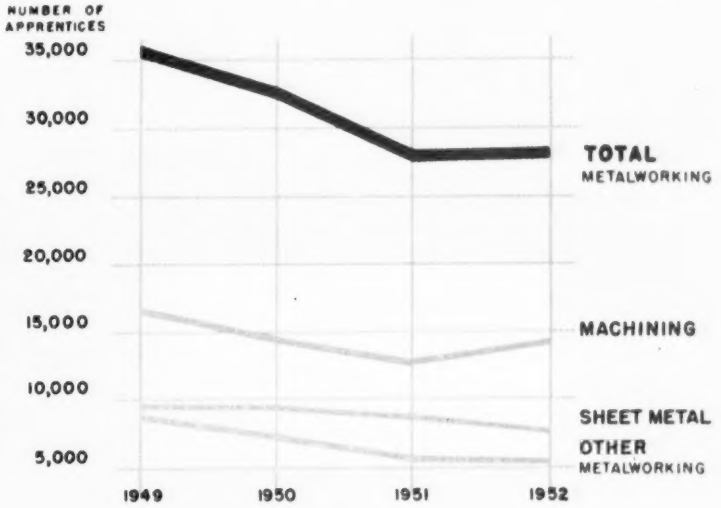


Where Are the Apprentices?

"THEY'RE PROBABLY all out driving trucks. It's terrible—no question about it."

A Pennsylvania manufacturer believes that the young men who should be apprentices are probably out driving trucks or taking other quick routes to make high money. He and nearly all the executives interviewed by STEEL agree that one of industry's most terrifying prospects is no skilled labor to turn out the complex machines for today's technology. Automation has intensified the need for such employees, not lessened it.

Greater Need—It is true that a machine now can turn out a product with closer tolerances than ever before without the aid of the human hand or mind. But to build such accuracy into that machine requires more skilled labor than ever before. That is why the downward trend of the chart above causes such concern to metalworking executives.

The average age of the journeyman today is high—55 years for molders, for instance. There are not enough young men with enough skill to replace the craftsmen who leave industry each year because of retirement, death or injury. Especially scarce in metalworking are tool and diemakers, machinists, molders, patternmakers, coremakers and other foundry apprentices.

Even Worse—The over-all apprentice picture is even more serious than for metalworking alone. In 1949, there were 234,669 registered apprentices in the U. S. That included many veterans of World War II who have since graduated or otherwise left their training. In June, 1952, the registered apprentices had decreased to 155,782. Even counting those in unregistered courses, the number would be 250,000 at the most, about one-eighth the number most experts feel this country needs.

Industry, labor and government have been aware of the need for more apprentices for many years. Over half the state governments have apprenticeship committees. In 1937, Congress passed the national apprenticeship law, commonly known as the Fitzgerald Act. Both labor and industry have cooperated with those laws in an effort to channel more of the young men into skilled occupations.

Where, Oh Where?—Regardless of the efforts expended, the big question still is: Where are the apprentices? Many metalworking officials feel that one of the basic reasons there aren't more trainees is that boys are not properly prepared for the skilled labors. Either their high school education overstresses college and the white collar jobs or the home and other influences stress the "quick buck" too much. A young truck driver, for example, can earn $125 a week. That would be considerably above an apprentice's wages but substantially below his later pay as a skilled machinist.

Another drawback for many boys is that the training period is anywhere from two to seven years long, with the average being four years. During that time, the apprentice, whose age ranges between 16 and 24 years, will earn anywhere between 50 and 75 per cent of a journeyman's wage. And he isn't exempt from the draft, either. Draft boards have been authorized by executive order to defer trainees if they have passed certain periods of their training and are making progress, but that is only a deferment at best.

No Teachers—A serious problem is reflected in the statement of officials at an Illinois tool

FEDERAL STANDARDS FOR APPRENTICESHIP PROGRAMS

1. Minimum apprentice age of 16 years.
2. Schedule of work experiences apprentice should gain.
3. Progressive wage scale which should average 50 per cent of rate paid journneymen over the apprenticeship period.
4. Related classroom instruction, normally 144 hours a year.
5. Adequate supervision and appropriate records of progress.
6. Joint establishment of program by employer and employees.
7. Indication that number of apprentices conforms to needs of the community.
8. Review and registration of written apprenticeship program, containing terms and conditions of employment and training, by the Bureau of Apprenticeship or a state apprenticeship agency recognized by the Federal Committee on Apprenticeship.
9. Registration of apprentice by Bureau of Apprenticeship or a state apprenticeship agency recognized by Federal Committee on Apprenticeship.

and die shop that they won't train apprentices because they don't have enough journeymen qualified as teachers. Many of today's journeymen and supervisors must themselves be retrained before they can be entrusted with the teaching of neophytes.

Finally, too few companies have sufficient testing programs to find out if an applicant has the ability and desire to be a good journeyman, resulting in too many incompletions of training.

Co-operation — The whole problem demands aggressive and cooperative action by industry and labor. Last year there were 47,600 registered apprenticeship systems of all types, of which only 5050 were in the metalworking industry —and not all of those were active. It is evident that more programs should be set up wherever feasible. Where two or more companies in an area are too small to have individual programs, they can pool their efforts and still come up with a plan which meets the standards.

Most experts on the subject agree that greater use of newspapers, radio and television commercials, as well as campaigns carried on in the schools and manufacturing plants, would increase the number of applicants for apprenticeship. Also, one of the area supervisors for the Labor department's Bureau of Apprenticeship claims that the first year of training is often spent running errands and doing tasks in no way connected with the skill the trainee is to learn. If that were eliminated, the training period could be cut down and the program made more attractive without actually lowering the standards. He also indicated that many manufacturers, especially foundries, could improve their working conditions to attract more and better apprentices.

What To Do—If your company is considering installing an apprenticeship training program, it is advisable to seek the advice and co-operation of the state or federal apprenticeship training agency. It will help you set up a program fitting your needs and abilities and also meeting the minimum requirements of the Federal Committee on Apprenticeship listed on this page. It is important to secure the co-operation of the labor union or your bargaining agent, because without this approval the program will not go far.

However, before any of this can come about, the company must really want it from the top down. For that reason, many experts suggest that the responsibility for the program be placed in one, or at the most two, top-level men. Such a move will lead to a more personal approach to the trainees, which is desirable.

Case Studies—It is also helpful to study several companies which have outstanding training programs. For example, Kearney & Trecker Corp., West Allis, Wis., has been training apprentices since 1901. Up to Mar. 1, 1952, they had hired 979 apprentices, of which 481 completed all of their training. At present, 75 are on the payroll.

Also on Kearney & Trecker's payroll now are 218 of those who completed their apprentice training at the company. Ninety-two are journeymen, 55 are superintendents and foremen, 32 are engineers, 20 are administrative personnel, 12 are sales servicemen and 7 are subcontracting and production personnel. The company feels it has been repaid many times for the expense of training those men.

One of Oldest—Brown & Sharpe Mfg. Co., Providence, R. I., has one of the oldest and best known systems in the country. Its latest graduate student book covers 1073 known living graduates dating back to 1887, of which 328 are still employed by Brown & Sharpe, mostly in supervisory and production executive rolls. Another 94 are presidents, vice presidents or owners of their own metalworking shops. The program costs the company $225,000 annually in overhead alone and about $1500 annually to train a machinist. But it pays dividends in manpower.

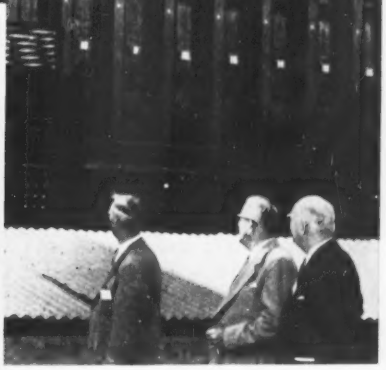
Thomas R. Reid, director of civic affairs for Ford Motor Co., now on loan to the Office of Defense Mobilization as assistant director for manpower, pointed up the urgency of the situation when he told STEEL: "Everybody in the mobilization base planning picture is agreed that the limiting factor in our ability to wage war is the availability of manpower. So we are mapping out a program to assure the use of workers at their highest skills and which will raise them to higher skills. To reach this objective, we need apprentice and other training courses on a vast scale—and they should be organized now in order to have them ready in case of a sudden emergency."

GM Wages Revised Upward

On Sept. 7, General Motors will increase its cost-of-living allowance to 390,000 hourly rate employees by one cent, due to the rise in the Consumers' Price Index from 113.7 on April 15, to 114.7 on July 15.

Under GM's formula, total hourly cost-of-living allowance for these employees during the months of September, October and November will be six cents per hour. About 100,000 eligible salaried employees will also receive an equivalent increase—$5. This will bring their allowance for the period to $30.

At 77, Eugene G. Grace, below, left, Bethlehem Steel Co. board chairman, still plans for his company's future. With him is A. B. Homer, Bethlehem president. At right, S. J. Cort, vice president, signals for the first "push" from a battery of 80 new coke ovens



Bethlehem Aims at Structurals Market

New battery of 80 coke ovens goes into operation at Bethlehem, Pa., plant. Expansion paves way for 50 per cent more structurals, mainly wide-flange beams

WIDE-FLANGE BEAMS — 60,000 tons per month. That's the target of Bethlehem Steel Co.'s current expansion program, S. J. Cort, vice president, revealed at ceremonies Aug. 19 marking the first "push" from the battery of 80 new coke ovens at the Saucon division plant in Bethlehem, Pa.

The new battery will add 1300 tons daily to the output of the four existing batteries and bring the Bethlehem plant's annual coke production to 2.3 million tons. It's the first new battery to be put into operation by the company since 1916.

Only a Means—"While this new battery is interesting in itself, its real significance can only be appreciated in relation to the over-all expansion of steelmaking facilities at Bethlehem," Mr. Cort told a group of invited spectators at the ceremonies.

Last March, Bethlehem lighted off its new "D" blast furnace and construction on a new "B" furnace is scheduled to get underway soon. The new coke ovens will feed these furnaces.

Up and Up—Increased production from the open hearths resulting from better fuels through coke oven gas conditioning and the output from the new furnaces will boost the Bethlehem plant's ingot production by about 15 per cent, the officials say.

The enlargement, modernization and rebuilding program at the Saucon division will provide about 50 per cent increase in structural capacity — 60,000 tons wide-flange beams and 10,000 tons shapes.

The Potential — "Our records show," Mr. Cort explained, "that there is a strong demand for large structural shapes for skyscrapers, bridge work and so on. It is to that end that much of this new coke will go."

As an adjunct to the new coke oven battery, a complete new gas conditioning and coal chemical plant was constructed. The new battery with all its appurtenances comprises a complete coking and coal chemical unit which could be operated independently.

And Still More—Coke oven gas is consumed in the operation of coke ovens, used for fuel in open-hearth and reheating furnaces and for domestic fuel use in the city of Bethlehem. Output of the coal chemicals is expected to increase to 57,750 gallons of coal tar, 75 tons of ammonium sulphate, 24,750 gallons of light oil, 17,325 gallons of benzol, 2800 gallons of toluol, 100 gallons of xylol and 3300 gallons of naphthalene daily.

Detroit Steel Expands

The nation's annual pig iron capacity was lifted 500,000 tons when the new 1400-ton, No. 2 blast furnace at the Portsmouth, O., Division of Detroit Steel Corp. was blown in.

The furnace has a hearth diameter of 28.5 feet, is Detroit Steel's second furnace and will triple the company's pig iron capacity from the present level of about 250,000 tons annually to over 750,000 tons. Its completion is another step in the firm's $60-million expansion.

Scheduled for installation early next year are four 250-ton open hearths, some new circular soaking pits, a 48-inch high-lift blooming mill and other related facilities. When these are erected, Detroit Steel's Portsmouth Division will be able to produce and process 1.3 million net tons of steel ingots.

Bricks To Toss Into the Market

Kinship to steel industry not enough; refractories look for new customers

AMOS N' ANDY, bread and butter, refractories and steel—they all go together. But the union between the last pair is not as pronounced as it once was; refractory makers hunt additional markets to stabilize their economic future.

Yet, the influence of steel on refractories is still pronounced and probably always will be dominant. Right now, steel business is good and so is refractory volume; the economic correlation between the two has been close for years.

New Shoes a Must—After the Korean war started, refractory makers couldn't produce fast enough. Customers pretty much walked in with their orders and handed them to sales managers. "Now," industry officials relate, "it looks like we'll have to do the walking." Competition—as everywhere—is beginning to show.

Demand and supply in refractories are equalizing; the one possible exception is in silica brick for relining coke ovens, which remains fairly tight.

The Majors—Fireclay, silica and basic refractories are the major types in use today. According to most estimates, the iron and steel industry accounts for about 65-75 per cent of the refractory market. Chemical, nonferrous metals, glass and ceramic producers and public utilities compose the rest of the market. Dollar volume for 1952 in the industry was about $301 million and most officials expect that with the July 1 price boost this year's sales should be about the same.

Most refractories kept pace with the steel industry expansion by expanding their own production facilities. Now that the steel industry program is about complete, refractory companies are beginning to cut production from former full-capacity levels.

Tomorrow's Answer — What about tomorrow's market? Leaders in the field are optimistic. Prices are firm. New markets promise to bolster sales when demand from present customers shows signs of slipping.

Several of the leading refractory officials contacted by STEEL said that the atomic energy field promises new sales in the next few years. Already some refractory makers are in the market, but most of it is "hush-hush" for the present.

The Little Ones, Too—Some of the smaller companies producing special refractories for the chemical and ceramic industries state that they are also expecting new customers as new developments continue in their fields.

Finding new customers won't end the refractories' problems either. As these new jet jobs and their rocket relatives begin to take over more and more of our daily duties, the refractories will be turning to their laboratories to meet the ever-changing chemical and thermal requirements of industry and its new processes.

Reviewing plans for the future, which include more research for higher heat resistant refractories and a stepped-up sales program, one industry official said, "What we're really looking for is a formula to make our business as resistant to recessions and depressions as our products are to heat."

General Aniline Mismanaged?

Interhandel, the Swiss firm which claims the controlling interest in General Aniline & Film Corp., has charged the Alien Property Office with incompetent management of General Aniline.

This company, which is negotiating with the U. S. for the settlement of its ownership claim, has said through its managing director, Walter Germann, that General Aniline has expanded sales only 55 per cent since 1946, while the 32 chemical companies located on the New York Stock Exchange have made average sales gains of almost twice that figure.

The relative loss is explained by the channeling of large postwar expenditures into long-established fields where profit margins are low, instead of into developing new products.

In pressing for a settlement, Interhandel restates that the majority of its shareholders are Swiss, American, British, French, Belgian and Dutch citizens. That even though its former name was I. G. Chemie, no connection of any kind existed with the German firm of I. G. Farben, except that Farben was its principal supplier of intermediates.

Small Business Gets Its Share

Defense department statistics for small-business participation in military prime contracts show small firms were awarded 17.2 per cent of the dollar value of purchases in April. During the period July, 1952, through April, 1953, the small-business figure was 16.2 per cent. In this 10-month period small firms received 34.1 per cent of Army dollar procurement, 20.1 per cent of Navy purchasing and 3.5 per cent of the value of prime contracts awarded by the Air Force.

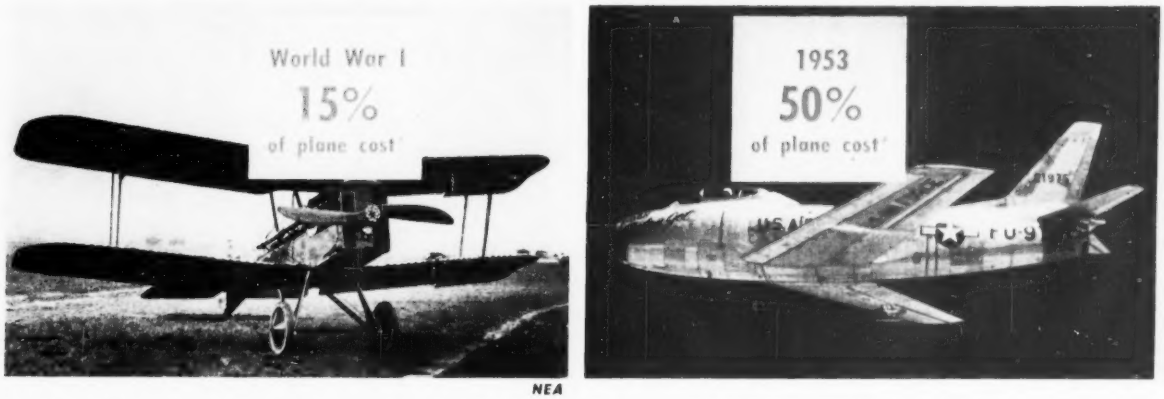
Bimetals Go to Three Industries

An estimated 95 per cent of all thermostatic bimetals produced in this country are used for circuit breakers, indicators and controls in the electrical, automotive, and heating and ventilating equipment industries.

Electrical equipment, says International Nickel Co. Inc., consumes an estimated 40 per cent of the total bimetals used, automobiles 35 per cent, and heating and ventilating 20 per cent.

One of the newest of the bimetals is Invar, an iron-base alloy containing 36 per cent nickel, which is commonly employed as a low-expansion element. Nickel-chromium-iron alloys are used on the high expansion side of bimetals. These applications plus a new welding process have resulted in safe use of bimetals at temperatures up to 1000 degrees F.

IN 35 YEARS AIRCRAFT COMPONENT COSTS SOAR



NEA

* World War I figure covers cost of entire airplane; percentage for 1953 is based on cost of modern jet fighter, less engines and radar equipment.

Aircraft Components: Too Many or Too Few?

Like Topsy, the number of parts needed for today's plane "just growed." Greater standardization would help in cutting down the staggering variety

IF THAT ROCKET RIDE to the moon is in the future, America's airplane component industry will probably be helping to make it possible.

When Orville Wright made his first flight he used only five components—a stop watch, a Veeder counter, anemometer, magneto and a radiator. In World War I, 15 years later, components comprised about 10 to 15 per cent of the cost of the finished airplane. A conservative estimate today of the component cost of a jet fighter would be 50 per cent of the cost.

The Debate—Some argue today that components are overloading and complicating modern military planes intolerably. Others point to the combat record of American fighters—about 18 to 1 in favor of the Sabre over the Russian MIG—and state that it is directly attributable to the numerous components.

Some of the problems facing the industry, startling facts about a component's importance in military planes and some predictions were related by J. C. Garrett, president of Garrett Corp., Los Angeles, at the second annual Air Force Association Airpower Symposium in Washington recently.

All-Important—He asked the association to give the component industry the planning and consideration in the future air power program that its size and importance deserve.

Illlustrating the importance of components, Mr. Garrett stated that a World War II Mustang fighter required a pull of 200 pounds in a high-speed pull-out. The Sabre, without the boost system of components, would require a pull of 5 tons. Some components may be eliminated from today's aircraft, but such elimination would probably reduce the utility of the aircraft, he declared.

Variety Not the Spice—The component industry would like to see more standardization in its work. Garrett Corp. alone is building 850 different models of missile and airplane components, including 45 different types of cooling systems. Mr. Garrett related that a conservative estimate of possible reduction in numbers would be one-third. "I hesitate to guess the hundreds of millions of dollars and vital production man-hours this would save in an all out emergency," he said.

Speaking of the future, he related that the only serious problem of temperature in World War II was keeping a pilot warm at high altitudes. With today's planes it is heat which may be the greatest single barrier to higher and faster flying. Already component makers are working on these and other problems.

Better and Better—No radical departures from the present trend in pressurization, air conditioning and auxiliary power are anticipated for passenger and cargo transports. Expected are simplification of flight instruments, flight control computers for heavy traffic centers like New York, Chicago and Washington and continued miniaturization of components with greater operating efficiency and durability.

"I believe that we can look forward with anticipation to reliable and safe operation of all-component turbo machinery, even with speeds exceeding 100,000 revolutions per minute with overhaul periods of 1500 to 2000 hours at these speeds," Mr. Garrett predicted.

The Field—There are about 1600 manufacturers in the highly competitive and specialized aircraft component industry. It employs over 600,000 people.

Copper Setasides Reduced

Copper setasides for delivery of military and atomic energy orders under the Defense Materials System during the first quarter of 1954 were reduced by Amendment 2 of NPA Order M-11A, issued Aug. 25, 1952, and effective the same day. The amendment applies to orders for copper and copper-base alloy products identified by the symbols A, B, C, D and E.

BEFORE: Strip mining left scenes like this in Birmingham

AFTER: Filled in and landscaped, the area looks like new

Republic Moves Mountains in Alabama

It's filling in and landscaping a strip-mined area at Red Mountain in Birmingham. The sector had an estimated 300,000 tons of iron ore

REPUBLIC STEEL CORP. moved a mountain, or part of it, and now it's moving it back.

The action began some time ago when Republic started strip mining to recover an estimated 300,000 tons of iron ore it owns in Red Mountain, just inside the city limits of Birmingham. In so doing, the company started a hue and cry from residents of the area who put more stock in the beauty of Red Mountain along Green Springs highway, a main traffic artery, than they did in the mineral wealth Republic needed for its blast furnaces in the district.

Protest — Some householders, most of them pretty far removed from the scene of actual operations on the particular 14-acre tract in question, said the blasting had damaged their homes. Experts who looked the situation over doubted that, but a lawsuit or two resulted nevertheless.

So, Republic has started to move the mountain back. Ben McCracken, head of the company's Birmingham mining operations, put a fleet of bulldozers on the job. They worked around the clock and are still at it to restore the natural contour of the mountain alongside the highway.

Bonus—Many residents now admit that the landscape may even look better than it did before the strip mining. Republic's crew already has planted honeysuckle along the entire stretch. Rye grass will be sowed next. By about December the first of nearly 17,000 pine seedlings will be planted. What's more, Republic has widened the highway at the crest of the mountain to make available a roadside park if and when the powers that be decide they want it and need it.

Deepest Well Set Many Records

The equipment used by Ohio Oil Co., Findlay, O., when its test well in the Paloma Field near Bakersfield, Calif., broke the world's record for deep drilling, can bask in the spotlight also. The equipment was almost as spectacular as the outward show, a well now more than 20,521 feet deep.

Among the tools, the diamond core drill heads, used almost exclusively below the 11,000 foot level, displayed amazing durability, being left on the bottom for as long as seven days at a time. The one-and-one-quarter-inch wire rope employed, says Jones & Laughlin Steel Corp., withstood just as severe a test, for it did the work formerly done by one-and-one-half-inch rope on the well that was previously the world's deepest.

The 6000-foot-long wire rope was also the longest line ever used in California, and it supported a string of nine-and-five-eighths-inch casing that was 10,947 feet in length, the longest string ever set.

The derrick's pipe rack alone would hold a casing load of 400,000 pounds. And the full-rigged derrick, which weighed 67,037 pounds, could hoist and control 300 tons.

Alcoa Plans Expansion In Iowa

Aluminum Co. of America was issued one of the largest certificates of necessity for accelerated tax amortization granted by the Office of Defense Mobilization from July 30 through Aug. 12. The certificate was for a $29.2-million expansion of its wide aluminum sheet and plate facilities at Davenport, Iowa; 50 per cent amortization was allowed.

ODM issued certificates on 81 projects amounting to over $158 million in the two-week period. This brought the total to $27.8 billion in certificates granted to date.

Consolidated Machine Tool Corp., Rochester, N. Y., was another firm in metalworking to get one of the larger certificates. It was issued a certificate for a $2-million expansion in special large machine tools, 85 per cent amortization allowed.

Machine Tool Orders Slip

New orders for machine tools in July totaled $73 million, a decline of about 10 per cent from June, according to a survey of all machine tool manufacturing centers.

This reduction was attributed to plant vacations and failure of some orders to be recorded during the month. But the order level is in

line with the predicted $75-million monthly average for the remainder of the year. And this amount will consist of an increasing number of civilian orders.

Plant vacations were also responsible for the 23 per cent drop in shipments by manufacturers. It is estimated that tool builders shipped something less than $80 million in July, compared with around $101 million in the preceding month.

More Pressure on Evaders

The reduction in the Internal Revenue Service headquarters staff from 3800 to 2800 people, currently under way, will not mean any relaxation of activities to spot tax evaders and make them pay. The money saved will be used toward the employment of 1200 new examining agents in a move to step up enforcement.

Appointments in Washington

Neil H. Jacoby, dean, School of Business Administration, University of California at Los Angeles, has been appointed the second member of the President's Council of Economic Advisers. He joins the recently selected chairman, Dr. Arthur F. Burns. A third member will be chosen soon.

Marvin A. Joy, manager of sales services for Chase Brass & Copper Co., Waterbury, Conn., succeeds Joseph F. Miller as director of the Copper Division, National Production Authority.

Julius J. Harwood, formerly deputy head of the Metallurgy Branch of the Office of Naval Research, Navy department, succeeds Dr. O. T. Marzke as head of the branch.

Edward F. Hamm Jr., publisher of *Traffic World* and related journals, has been appointed the first managing director of the Interstate Commerce Commission.

Everett G. Fahlam, president of Permold Co., Medina O., and Gordon Manufacturing Co. Ltd., Wallaceburg, Ont., has been selected a deputy director of the Aluminum Division, National Production Authority.

Samuel N. Comly, vice president and treasurer, Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., has been appointed assistant administrator, National Production Authority. He will be responsible for operations of the industry divisions of NPA.

New Antitrust Policy Takes Shape

The FTC will assume preventive functions, leaving to the Justice department the major prosecuting role. Mild action will be dealt to those who err in good faith

WATCH FOR antitrust law enforcement under the Eisenhower administration to fall into this pattern:

Rigorous prosecution of deliberate violators and monopolists; simple corrective action for those who err in good faith; gradual de-emphasis of the prosecuting function by the Federal Trade Commission which will leave that role to the Department of Justice.

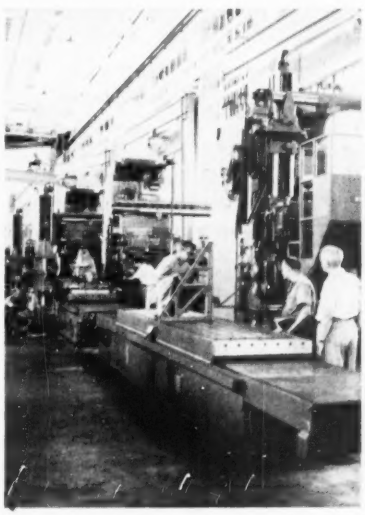
Justice Position — Speaking at Pittsburgh on Aug. 20, Judge Stanley N. Barnes, assistant attorney general in charge of the Antitrust Division, said, "I wish to emphasize that the attorney general and I are determined to vigorously utilize the antitrust laws to protect our system of competitive free enterprise against monopoly and unfair competitive practices whenever and wherever found. On the basis of equality, impartiality and common sense, we are convinced that businessmen generally will recognize that such a program is essential to the preservation of our capitalistic system of free enterprise."

Alluding to the attorney general's National Committee to Study the Antitrust Laws—of which he and Prof. S. Chesterfield Oppenheim, University of Michigan Law School, are co-chairmen — Judge Barnes said, "An effort is being made to simplify the administration of the antitrust laws, both procedurally and substantively, in order to facilitate the impartial and effective enforcement of the law and at the same time to assist businessmen who, in good faith, seek to comply with the law."

FTC Position — In the Federal Trade Commission, the reorganizing moves are toward the objective expressed by Chairman Edward F. Howrey in his now-famous University of Michigan speech in which he said: "In creating the Federal Trade Commission, Congress had two principal ideas in mind: First, to create a body of experts competent to deal with complex practices 'by reason of information, experience and careful study of business and economic conditions;' and second, to authorize this body of experts to deal with unfair competitive methods in their incipient stages. The action was to be prophylactic; the purpose was prevention of diseased business conditions, rather than cure."

In order to carry out this policy, he has instituted a cost study division to develop standards for measuring injury to competition, and he proposes to establish a Bureau of Consultation to obtain co-operative action from businessmen when injury to competition is shown or indicated.

A noteworthy feature of the new policy, as expressed by Judge Barnes at Pittsburgh, is that all price discrimination cases—particularly Robinson-Patman Act angles—will be wholly within the bailiwick of the FTC.



Elephants by Carloads

Employees of Cincinnati Milling Machine Co's. Plant No. 2, Cincinnati, have received the congratulations of their president on a notable achievment—200 carloads of elephant-size machine tools totaling 9000 horsepower built and shipped in the past 18 months. Above, building the tools in the new "high bay" plant addition

Windows of Washington

By E. C. KREUTZBERG *Washington Editor*

Commerce Secretary Weeks reverses his position. The controversial Dr. Astin is back in good standing as director of the Bureau of Standards

"I HAVE ASKED Dr. Allen V. Astin to continue as director of the National Bureau of Standards and he has agreed to do so . . . He is from here on a member of my team."

In those words Secretary of Commerce Sinclair Weeks reversed his one-time view that Dr. Astin would have to go and be replaced by a director who would remedy the "serious lack of balance in the programs of the bureau, imperfections in the system of evaluating commercial products and inadequacies of organization and administrative control."

From Outside—Reason for the reversal is the finding, by Mr. Weeks personally and by the Evaluation Committee headed by Dr. M. J. Kelly, president, Bell Telephone Laboratories Inc., that the objectionable features in the bureau's functioning originated largely from outside—and particularly from the imposition on the bureau of a big weapons development load. In fiscal 1953, Mr. Weeks reports, the basic work of the bureau amounted to less than 25 per cent of its total effort; the major effort was expended on work in weapons development.

The weapons programs are to be turned back in September to the Department of Defense—thus returning the bureau to the fundamental work for which it was created.

To aid the director in planning new programs and in maintaining proper balance and emphasis in existing programs, small committees of outstanding scientists from the country's great technical and scientific societies will visit with him in an advisory capacity.

Too Much Paper Work — The Kelly committee found that 14 of the bureau's 17 technical divisions report directly to Dr. Astin and that this so overburdens him with internal management problems that he is unable to give adequate attention to his broader responsibilities.

The committee has recommended "a sound administrative pattern that will relieve the director of detailed supervision and make his time available for the essential professional functions of the office." The administrative procedure will be worked out by Assistant Secretary of Commerce for Administration James C. Worthy.

NEA

ALLEN V. ASTIN
. . . member of the team

Another Matter — What about the battery additive AD-X2 case in which a congressional committee and Secretary Weeks agreed that the bureau had denounced the additive's worth without ample investigation? The bureau's actions in connection with this case still are under study by a committee appointed by the National Academy of Sciences which has not yet come up with a report. In the meantime it is Secretary Weeks' position that there was no intent to defraud on the part of the additive manufacturer — and that hence the government has no basis for acting against the manufacturer.

It was this concept that led to withdrawal of the Post Office ban on use of the mails by the manufacturer, Jess M. Ritchie, Oakland, Calif. After the removal of this ban, Mr. Ritchie told a press conference that he would at once launch a country-wide campaign to promote sales of the battery additive.

ODM Studies Nickel . . .

The question as to whether nickel should be continued under control has been referred by the Defense Mobilization Board to the Office of Defense Mobilization for a decision.

Removal of all government controls "as soon as practicable" on the civilian use of nickel was unanimously recommended to the NPA on Aug. 13 by the Industry Advisory Committee of Primary Users of Nickel for Chemicals and Electroplating. Consumers of nickel-bearing stainless steel and electroplaters had complained about the restrictions imposed by NPA Order M-80 curtailing use of nickel. It is estimated that 40 per cent of the nickel supply presently is required for direct defense and AEC requirements, excluding stockpiling.

A Job for Mr. Struggles . . .

Secretary of Commerce Weeks has called in John E. Struggles, a Montgomery Ward personnel official, to "evaluate" all Commerce department aides occupying policy-forming positions. Mr. Struggles will get from the assistant secretaries their ideas of the key jobs in their areas and then will examine the qualifications of the people now holding them. "It is expected," Secretary Weeks said, "that the program will serve to identify and provide a means for developing leadership qualities in personnel and to provide a reservoir from which key appointments may be made."

DOW CHEMICAL saves *thousands of dollars annually* with BAKER TRUCKS

■ At the Pittsburg, California, plant of The Dow Chemical Company, five Baker Fork Trucks expedite handling of material in production, storage and shipping departments.

Two of these trucks transport 16″ cylinders of ammonia—twelve at a time—from production to warehouse and from warehouse to shipment, and load them directly into boxcars or highway carriers.

The remaining trucks speed handling of chemical products in bags or cartons on pallets—taking them from production to storage, where they are high-tiered to conserve floor space, and from storage to shipment, where further man-hour savings are made in loading.

Material was formerly transported manually and hand-stacked. Cylinders were rolled by hand, one at a time. The use of Baker Trucks has resulted in savings of thousands of dollars annually.

Write for *your copy of the "Baker Handling Library" a new portfolio of actual case histories.*

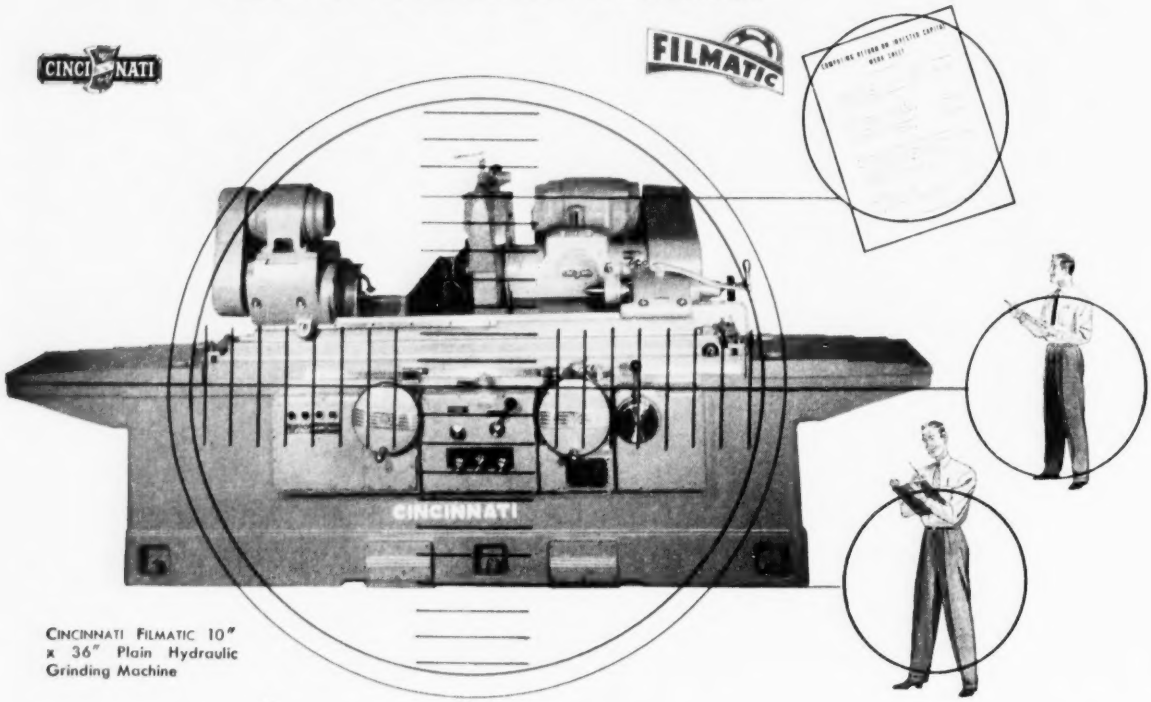
Baker industrial trucks

THE BAKER-RAULANG COMPANY
1259 WEST 80th STREET • CLEVELAND 2, OHIO

The Baker-Lull Corporation • Subsidiary, Minneapolis, Minn.
Material Handling and Construction Equipment

Any Way You Look at it...

CINCINNATI FILMATIC PLAIN HYDRAULIC GRINDERS REDUCE COSTS IN YOUR SHOP



CINCINNATI FILMATIC 10" x 36" Plain Hydraulic Grinding Machine

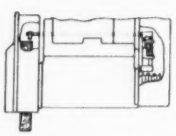
Look at the spindle bearings, the bed construction, lubrication of ways, electrical controls. Look at everything that effects efficient, low-cost production of precision centertype grinding, and you'll agree that CINCINNATI FILMATIC Plain Hydraulic Grinders have the potential to save a lot of money for your shop. A few ways in which the superior features of CINCINNATI FILMATICS keep costs at a minimum are illustrated at the right.

* * * * *

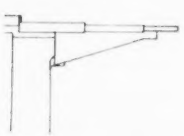
Any way you look at it, CINCINNATI FILMATIC Plain Hydraulic Grinders are the best buy for variety or production centertype grinding operations. It will pay you to replace your old grinders *now* with new CINCINNATIS. Brief specifications will be found in Sweet's Machine Tool Catalog. You may obtain complete data by writing for literature: No. G-566-2 for the 6" and 10"-L sizes; No. G-603 for the 10" and 14"-L sizes.

CINCINNATI GRINDERS INCORPORATED
CINCINNATI 9, OHIO

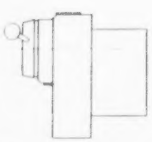
CINCINNATI'S exclusive FILMATIC bearings for the grinding wheel spindle require no adjustment; over 99% have never required service or maintenance.



To minimize wheel cost, these machines are equipped with a two-speed device for the grinding wheel.



Sliding covers protect the ways, reduce maintenance costs, increase life span.



Unit construction for principal hydraulic elements cuts maintenance expense.

Automatic filtered lubrication of ways aids greatly in maintaining straight-line traverse and close accuracy for years.

CINCINNATI

CENTERTYPE GRINDING MACHINES • CENTERLESS GRINDING MACHINES
CENTERLESS LAPPING MACHINES • MICRO-CENTRIC GRINDING MACHINES

Line in a Russian "automatic factory" producing automobile engine pistons

RUSSIA Enters World Auto Market

High-frequency tempering of parts at the Stalin Auto Plant in Moscow

Only a trickle of Russian-made cars has seeped out from behind the Iron Curtain, but flow could be greatly increased. Romania and Communist China start auto plants

THE SOVIET UNION's trade offensive is bringing Russian automobiles through the Iron Curtain and onto the world market in quantity for the first time.

Initial shipload of 120 small Russian cars landed at Rotterdam, Holland, late in July. Most were sold immediately, and importers expect further monthly deliveries until 500 cars have arrived.

Doubtful Contender — Similar prestige-building shipments of attractively-priced Red automobiles to other non-Communist nations may well be part of the Soviet Union's economic strategy. Russia is capable of embarrassing capitalist countries by selling a few thousand cars below cost wherever it suits the Kremlin's purposes. It's doubtful the U.S.S.R. can be an important factor in the world automobile market for some time to come, however; the Soviet Union today does not produce enough cars and trucks to satisfy its own needs.

In 1950, Russia manufactured about 400,000 motor vehicles, three-fourths of which were trucks. Production goals for the current Five Year Plan call for a 20 per cent increase, or nearly 500,000 motor vehicles annually by the end of 1955.

The Soviet Union has but four basic automobile models in use today:

Smallest—The Moskvich is the one most likely to spearhead Russia's invasion of foreign markets. It's a four-place, four-cylinder car somewhat larger than the Crosley and apparently patterned on the German Opel. First produced in 1946, it has a 23-horsepower engine, gets about 26 miles a gallon of fuel and has a maximum speed of nearly 60 miles per hour.

Cheapest — The most modestly-priced, standard-sized automobile is the Pobeda (GAZ-M-20). Resembling the prewar Ford, the four-cylinder Pobeda accommodates five passengers, has a 50-hp engine which permits a 68 mph top speed and gets 17 miles to a gallon.

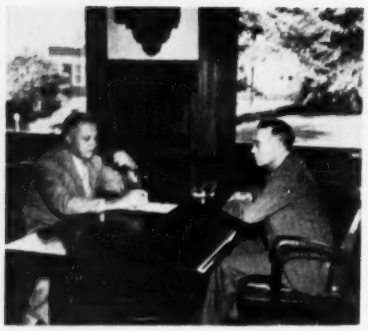
Most Modern—Sleek and streamlined, the six-place ZIM boasts a 90-hp, six-cylinder engine and a maximum speed of about 75 mph.

Biggest—Largest and most expensive Soviet automobile is the eight-cylinder ZIS-110. Resembling a prewar Packard, the ZIS-110 can accommodate seven persons, has a 140-hp engine and a maximum speed of nearly 90 mph. Weighing over 5600 pounds, the ZIS-110 gets less than 10 miles to a gallon of fuel and is the only Soviet car not slated for marketing in Holland.

Coincident with its invasion of the foreign automobile market, Russia has announced plans to modernize the Moskvich, Pobeda and ZIS-110. Several truck models are also being modernized. The Soviets are ambitiously planning new factories "where the whole process of producing parts is carried out automatically, beginning with the molding or casting of the metal and finishing with the machining." The U.S.S.R. also claims to be the first to put new models into production without stopping work. "As the last car of the old model is run off the belt," a recent Soviet magazine declared, "parts of the new model are being assembled at the head of the conveyor."

Russian satellites are also expanding automobile manufacture or starting it for the first time. Romania in June began assembly-line production of trucks, said to be the first highway vehicles produced in Romania. In July, Communist China started construction on that country's first automobile factory.

While the present efforts of Russia to move into world automobile markets seem ludicrous, the West would do well to watch such developments closely. Peoples of many nations in the world do not necessarily want the latest style in motor vehicles as long as the price is right. Then, too, one can never tell when the Soviets are going to "discover" the V-8 engine.



MANAGEMENT — J. B. Griffin confers with his boss, Scovill Vice President Mark L. Sperry

SALES—Co-ordinates movement of goods with Merchandise Div. Sales Manager S. M. Main

PURCHASING—Checks through Purchasing Dept. records for volume of incoming materials

Traffic Control

Key to economical movement of goods

By SAMUEL W. BAKER
Associate Editor

"OUR CHIEF CLEARING HOUSE out to the commercial world" is the way one department head at Scovill Mfg. Co., Waterbury, Conn., describes his company's traffic department.

For Scovill — oldest brass company in the U. S. and fabricator of aluminum, steel, nickel and various nonferrous alloys — moving raw materials and finished goods efficiently and economically is a sizable job. Its thousands of production items range from common pins to 3000-pound coils of brass strip.

It takes a topnotch traffic expert to plan the complex movement of materials and goods in and out of the Waterbury plant. Scovill has one of the best in James B. Griffin, superintendent of traffic. A veteran of nearly 30 years of traffic control on railroads and in industry, he is author of the Griffin Plan for channelizing l.c.l. freight shipments that's been adopted by many shippers.

Until about ten years ago most management men considered traffic control a necessary evil or a mere accessory function of production or accounting departments. Too, many of the men in traffic were misfits who hid behind the cloak of baffling rate schedules and legislation and had only a superficial knowledge of their jobs.

New Look — Today, with competitive screws tightening, more and more companies are looking at industry's estimated $17 billion annual transportation bill as a likely place to wring water out of costs. They're finding that a traffic control expert is more than just a glorified shipping clerk. He represents a major tool for leveling distribution costs and offers a bonus in management guidance as well. Evidence of this can be seen in his industrial growth: Some 3000 companies today have separate traffic control departments.

Transportation costs show up in prices of things you buy as well as sell. Though freight may be absorbed on incoming materials, costs of its transportation and handling figure in the price nonetheless. Because freight accounts for an average of 10 per cent of the cost of an item, study of transportation costs can cut sizable fat from delivered costs.

The Job — What does a traffic manager do? Basically he regulates and synchronizes transportation and production through knowledge of routing, loading, rates, regulations, types and condition of equipment and facilities — controlling movement of goods to meet operating schedules and customers' needs.

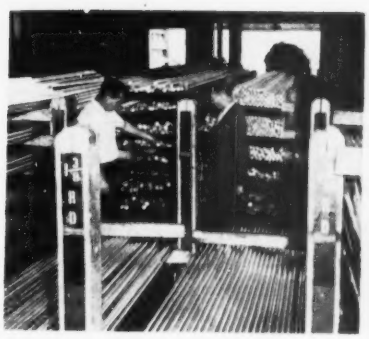
Chesapeake & Ohio Railway says he controls nearly one-fourth of the industrial wealth produced in the U.S. An insurance company survey shows one-third of industry's money is invested in its shipping bill. Industry currently employs about 5000 to 6000 traffic control men.

Back Your Men—A good traffic man can and should be part of the management team. Given proper authority he can save you money in product design, plant or warehouse location, opening new markets, production control, packaging, product classification, inventory control and a host of related operations.

If you find a low price on raw materials, maybe you'll lose money by the time it's delivered. Even the seemingly small matter of timing can be costly. Industry pays over $40 million a year in demurrage alone—caused chiefly by lack of co-ordination between purchasing and traffic. A freight car is an expensive warehouse.

It Looks Easy—At Scovill's main plant, controlling movement of 400

WAREHOUSING—Reviews plans for a new Scovill warehouse with chief aide W. H. Morrison



PRODUCTION — Inspects stocks of rod mill products ready for shipment to Scovill customers

SHIPPING—Checks up on open car shrouded packaging of brass rod being readied for shipment

million pounds of incoming materials (including expendables) and 200 million pounds of outgoing fabricated products a year is no simple operation, but Jim Griffin makes it look easy. In an average day he handles an endless stream of telephone calls, runs through a small mountain of correspondence, talks with transport company representatives, oversees some 65 employees in traffic and consults frequently with other operating departments.

In addition to his duties at Waterbury, Jim Griffin assists the company's seven divisional plants in the U. S., Canada and England on rate questions and traffic policy matters. He is consulted on shipping problems concerning Scovill's eight warehouses across the country. His department helps determine whether it is more advantageous to ship small orders directly to customers from Waterbury or in carlots to warehouses for distribution. Traffic also has charge of maintaining and operating over 200 pieces of mobile equipment used for in-plant transportation.

Surprise Is Usual—On a typical business day, Jim Griffin doesn't wait for trouble to reach him. He tries to anticipate what will happen and cope with it first. Spot troubles still crop up though. "There's nothing but surprises in this business," he smiles.

The early morning mail and pressing matters under control, Mr. Griffin drops in on his boss, Mark L. Sperry, vice president. They quickly finalize plans for moving into a new 60,000-square-foot shipping-receiving warehouse.

Spot Check—Next comes a check with purchasing to determine volume of incoming materials. Unloading crews and docks, storage space and intraplant movement of these materials must be planned in advance. If deliveries are irregular, Jim Griffin studies the shipper's routing and often suggests quicker or cheaper routes and types of transportation. As a rule of thumb in freight routing he says: "Route as the crow flies and you can't miss."

Another area of close liaison is the sales department. S. M. Main, sales manager, merchandise division, stresses the importance of sound traffic control in saying, "Prompt movement of finished goods to a customer is about the most effective sales tool I know of."

Knotty Problem — Back at his desk, Jim Griffin this sunny August morning finds that developments in a New England truck strike threaten to paralyze Scovill shipments, a large share of which go by truck.

To a strike-bound trucker grumbling because goods he normally would have carried are being delivered by other means, Jim Griffin philosophizes: "There is no such thing as exclusive traffic." Another caller is a union leader complaining of a truck loading at Scovill's dock. Mr. Griffin calms him by explaining that the trucker's contract was not subject to local conditions because he has a separate contract with the union as a specialized carrier.

Matter of Economics—"Economics of the situation—cost, service and time—determine how goods are shipped," says Mr. Griffin. Scovill uses truck and rail mostly; contract air service on specialty items amounts to less than one per cent of freight moved.

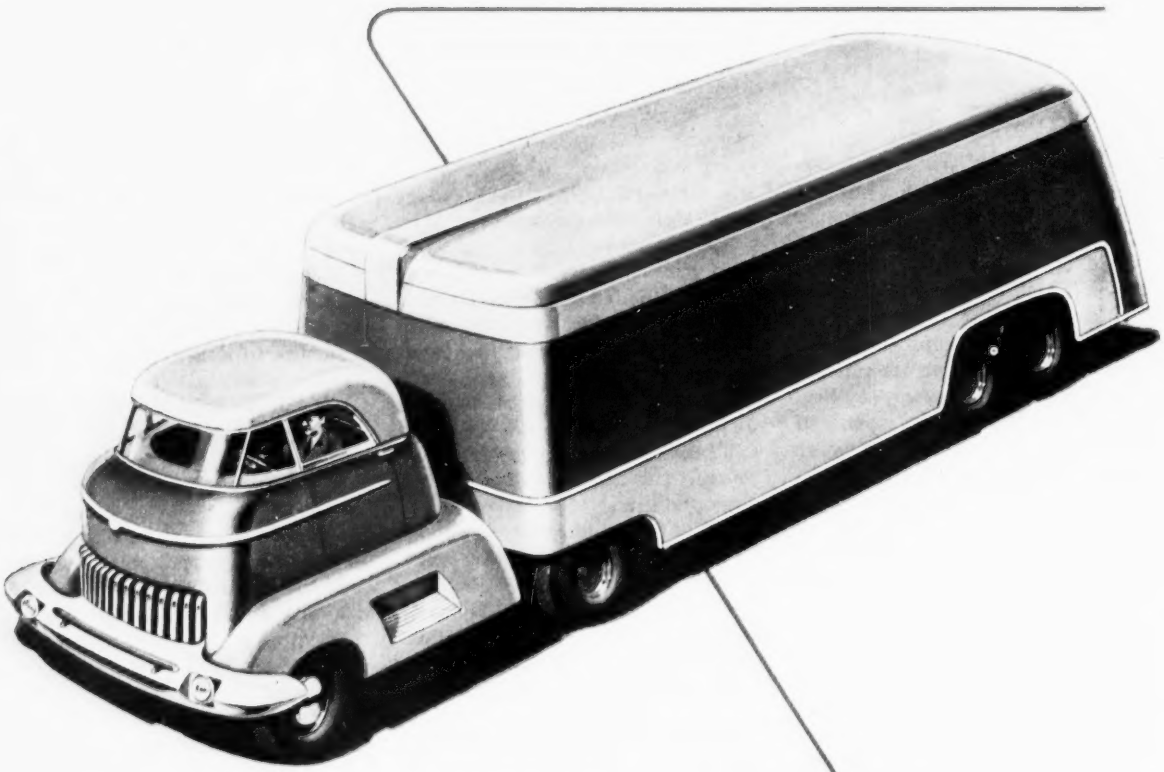
Jim Griffin believes shippers have a big stake in financial success of their carriers. Not long ago, he cut back the number of truck ownerships the company does business with from 109 to 59. Theory is that by creating mass volume and not spreading crews those 59 will have a better chance to make money, thus helping develop a stable trucking industry.

Concentration — The same philosophy is reflected in Scovill's rail shipments. "Too many traffic men forget the objectives of their job and think they must give all the roads business," comments Mr. Griffin. "They dilute tonnage by spreading it among many carrriers; thus the carriers don't have enough business to give good service, nor can they anticipate schedules properly. This thinning out of business has caused much of the over 100 per cent increase in freight charges on l.c.l. shipments since 1946."

While the Griffin-inspired l.c.l. system doesn't save shippers money, it saves them time. By cutting handling, transfers and paperwork, it reduces railroads' cost on small-lot shipments, thus stimulating l.c.l. traffic. In by-passing unnecessary

(Concluded on page 68)

Specify N·A·X HIGH-TENSILE STEEL for Lighter Weight, Longer Life and Operating Economy



N-A-X HIGH-TENSILE, having 50% greater strength than mild carbon steel, permits the use of thinner sections—resulting in lighter weight of products. It is a low-alloy steel—possessing much greater resistance to corrosion than mild carbon steel with either painted or unpainted surfaces. Combined with this characteristic, it has high fatigue and toughness values at normal and sub-zero temperatures, and the abrasion resistance of a medium high carbon steel—resulting in longer life of products.

N-A-X HIGH-TENSILE, with its higher physical properties, can be readily formed into the most difficult stamped shapes, and its response to welding, by any method, is excellent. Due to its inherently fine grain and higher hardness, it can be ground and polished to a high degree of lustre at lower cost than can mild carbon steel.

Savings in vehicle weight, with no loss in structural strength, increase the payload ratio and give greater operating economy when you make it a point to specify N-A-X HIGH-TENSILE steel for your highway equipment.

MAKE A TON OF SHEET STEEL GO FARTHER Specify N·A·X HIGH-TENSILE STEEL ... And "MAKE YOUR PRODUCT LAST LONGER"

GREAT LAKES STEEL CORPORATION

N-A-X Alloy Division — Ecorse, Detroit 29, Michigan

NATIONAL STEEL CORPORATION

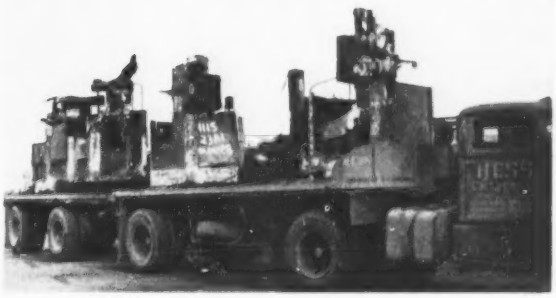
KEEP YOUR SCRAP MOVING TO YOUR DEALER

By FLOYD G. LAWRENCE *Detroit Editor*

Mirrors of Motordom

Plucked out of the ruins, machine may yet be salvaged

A master mechanic decides what to junk, what to salvage



Off goes another truck load of machine tools to be rebuilt

What would you do in case your plant was destroyed? GM faced that problem after the Livonia fire. Here are the steps it's taking to get back in production

DETROIT

DISASTER is by definition "a sudden and extraordinary misfortune."

The fire which reduced the shining General Motors Detroit Transmission Division plant in Livonia to a $40-million mass of twisted rubble in less than an hour on the afternoon of Aug. 12 was such an occurrence—disaster, sudden and intense.

Rubble—When dawn broke the following morning, an area of smoking ruin larger than 31 football fields was all that remained of a plant which a few hours before was producing Hydra-Matic transmissions. Men moved about the scene in stunned silence, finding it difficult to believe that the worst single-plant fire in the nation's industrial history had struck Detroit Transmission.

"It'll take a miracle to get us back into production," muttered one soot-stained worker hopelessly. And perhaps at about the same time that very thought was in the minds of metalworking men all over the country reading news of the disaster in their morning papers and wondering what they would do if it had happened to them. But the miracle had already begun.

Miracle in Practicality—While the flames still raged in many parts of the plant on Wednesday night, a meeting was under way to set up a general plan for salvage and rehabilitation of the plant and equipment. S. E. Skinner, General Motors' vice president in charge of parts and accessories, Edward A. Kaegi, general manager of Detroit Transmission Division and the department heads of the plant laid down the initial principles on which the salvage operation is progressing. By Thursday afternoon, less than 24 hours after production was halted by the fire, the first cranes had moved into the plant area to begin the salvage job.

In the intense heat of the fire, girders had buckled and the steel roof had sagged like a giant blanket down over the equipment. The first step, therefore, was to make a series of holes about 100 feet wide at intervals of perhaps 100 yards down each side of the plant. Into these holes the cranes moved, lifting off the roof sections and piling them onto waiting railroad cars to be sold as scrap. During these initial stages of the salvage operation, equipment was removed much as the cranes came to it to give them the space they required to work. But within a few days the full plan swung into operation and here is how it was set up.

Teamwork—Each department of the former plant was included in an area map. The key men who worked in each department and knew the equipment best were assigned to 38 teams, each of which was responsible for the evacuation of its own equipment. Thus there is an input shaft team, an output shaft team, a case team, a brake band team, a flywheel team, etc. These men moved into the wreckage ahead of the cranes numbering the equipment and determining which equipment should have the greatest removal priority whether because of complexity of repairs, difficulty of replacement or a key role in manufacture.

With floodlights set up and the cranes working almost around the clock, the last machine tool was removed from the plant Aug. 24—over 3300 machines in less

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than 12 days. But in the meantime, the second step in the salvage process was already moving along.

Inspection—As each machine was removed it was lowered into an inspection area. There, one of many master mechanics borrowed from the many GM divisions examined the machine closely to determine as nearly as possible the exact extent of the damage. Depending on his analysis, the machine was moved into the shipping area to be returned to the builder for rebuilding, to be taken to one of the GM division maintenance sections for reconditioning or was moved aside to be replaced.

An amazingly small percentage of the equipment will require out and out replacement. The major damage was to insulation and electrical components. Most of the machines will have to be rewired, and one unofficial estimate places the number of motors to be rewound at over 20,000. Delco-Remy Division in Dayton is to do most of this job. But in most cases spindles and gears are in good condition and the bulk of the machines themselves require only cleaning, checking and possible replacement of the bearings. It takes a great deal of heat to warp a casting, and though the heat was intense, few castings were heated enough to damage seriously the basic structure of the machine. One master mechanic reported that he will have the machines assigned to his plant for reconditioning back ready to go into operation in less than six weeks.

Trouble with Tooling—The tooling on the machines did not fare as well as the equipment itself, however. Jigs, fixtures, slides, pawls and the other complex mechanisms, which adapt a machine to a job on close tolerance parts were in many cases not protected by an insulating casting. Rust and warpage from the heat have turned much of the precision metal into junk. Early in the salvage process orders went out for a large quantity of tooling but from a great many suppliers. With each tooling supplier having only a few jobs to do, it is expected that as the equipment returns from 166 rebuilders in 55 cities and 14 states, the tooling from sources even more divergent will be waiting for it.

The equipment is now being reconditioned. You perhaps have seen some of the hundreds of truckloads on their way to or from a repair center, and already equipment has started to arrive at the Willow Run plant which GM has partially leased from Kaiser Motor Corp. until the Livonia plant can be rebuilt.

Follow-Through—As the equipment arrives at the Willow Run plant, the same teams which supervised the removal of the equipment from the burned-out plant follow through on their job. These men will supervise the placement and installation of equipment in their departments in the new plant following right on through into production.

It seems a safe bet that the first Hydra-Matic unit will come off the rebuilt assembly line about the middle of October and possibly even before. That will be the culmination of what already, to the minds of many people, looks like a miracle.

Certainly this General Motors undertaking may well be the greatest industrial reorganization ever undertaken both in speed and in scope. But to call it a miracle detracts somehow from the intelligent planning of the program behind the accomplishment of so much in so little time.

Auto, Truck Output

U. S. and Canada

	1953	1952
January	612,815	424,559
February	623,793	464,577
March	752,474	525,024
April	782,453	570,464
May	685,390	542,559
June	713,206	542,479
July	756,543	226,134
August		322,755
September		595,715
October		656,767
November		548,782
December		569,715
Total		5,989,509

Week Ended	1953	1952
July 25	172,874	42,514
Aug. 1	168,267	22,181
Aug. 8	137,671	43,964
Aug. 15	156,526	36,890
Aug. 22	163,589	109,588
Aug. 29	157,000*	122,632

Sources: Ward's Automotive Reports.
*Estimated by STEEL

Exhaust Notes

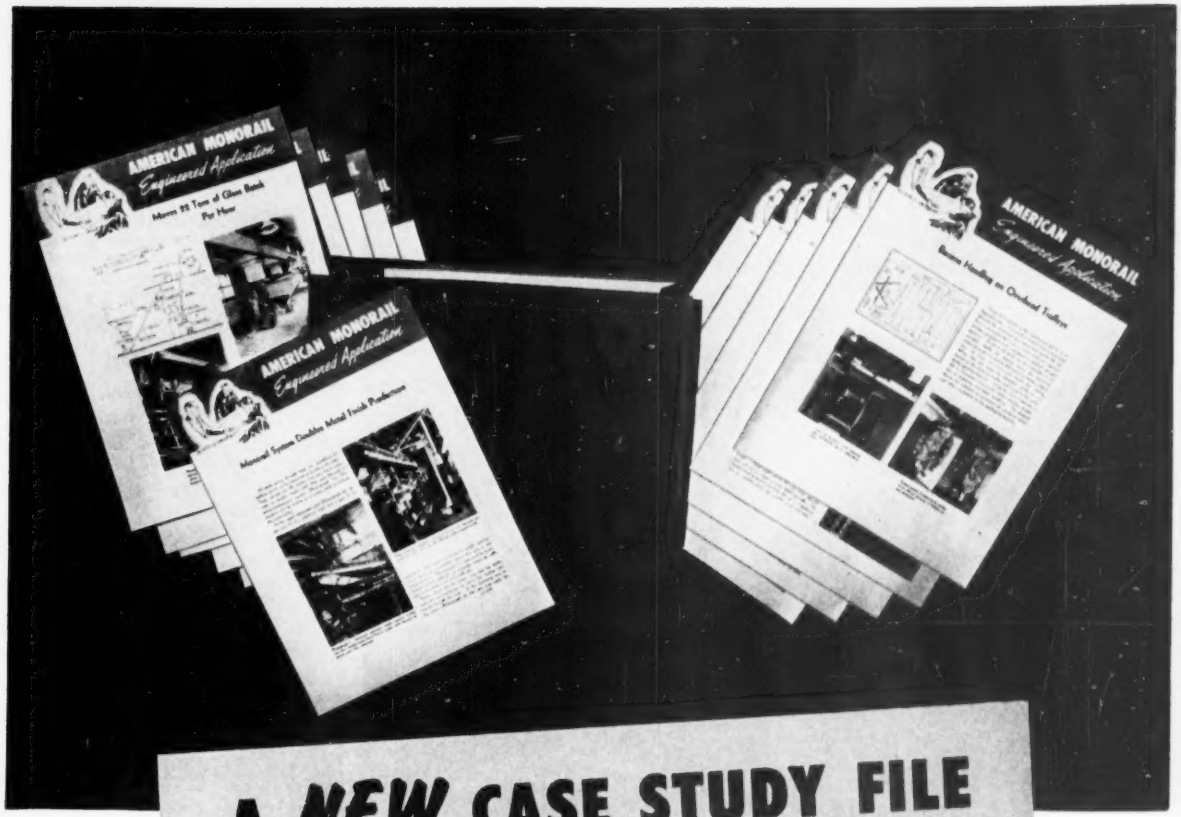
Modification of Dynaflow for Cadillac and Oldsmobile and Powerglide for Pontiacs looms as a relatively easy process. Cadillac, for example, will modify the crankshaft spline, have a new bell housing cast and lengthen the output shaft of the Dynaflow unit to complete the adaptation. Engineers report they began working on the prototype Friday afternoon, and on Sunday the car was ready to roll. Similar adaptions are required on the Olds and Pontiac, and prototypes of all three cars are now undergoing hurried engineering tests at the GM proving ground prior to early September production.

Reports from those who have seen the new Hudson sports car report that it is a closed two-passenger coupe on a Jet chassis. The body by Vignale is in the classical Italian style reportedly similar in general appearance to the Chrysler K-310. With a souped-up Hudson Jet engine of 114 hp, a top speed of about 110 is claimed for the car. With a Hornet engine, which delivers 160 hp in 1953 models, the car should reach about 140 mph. Incidentally, the 1954 Hudson Hornet engine is rumored to deliver 175 hp. Another feature of the new car is reportedly a curving side to permit easier dirt removal from the step-down floor.

Incidentally, announcement of the 1954 Hudson models planned for early September is going along on schedule. Negotiations with Borg-Warner for the transmission now used on Studebaker cars reportedly have been successful, and B-W will supply enough initial volume to permit introduction on time.

Automatic drive, by the way, is well on its way to becoming standard equipment. One industry authority says that within the next few years the volume of automatic transmissions will make the syncromesh optional equipment. And with the reduced volume, it will cost you more to buy gear-shifting than to go along with the shiftless majority.

Ford reportedly will be in for some competition in Brazil where the West Germany Volkswagen Co. will shortly open a $32-million production plant near Sao Paulo. Ford opened a $10-million assembly plant there last April.



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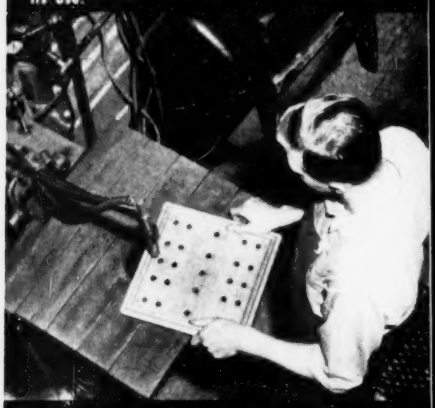

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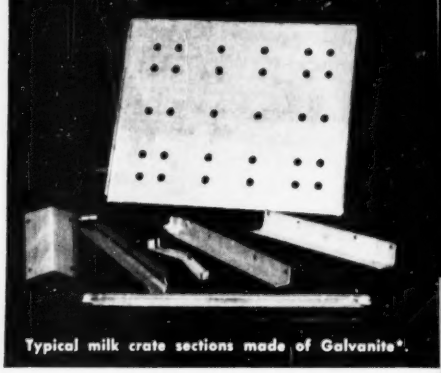

Typical milk crate sections made of Galvanite*.

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Here's Why Leading Crate Makers Specify SHARON Galvanite* Steel

Few items in every day use receive the rough treatment a milk crate gets . . . and fewer still are subjected to more rust provoking conditions. From dairy to truck to dairy these crates are constantly shuffled through the dampness common to the milk business.

Several leading manufacturers of milk crates have been specifying Sharon Galvanite* for a number of years. A leading Pennsylvania manufacturer told us he had tried several coated steels . . . that twenty years ago he hit upon Galvanite* . . . that his customers actually asked him to continue its use, which he has with exceptional success.

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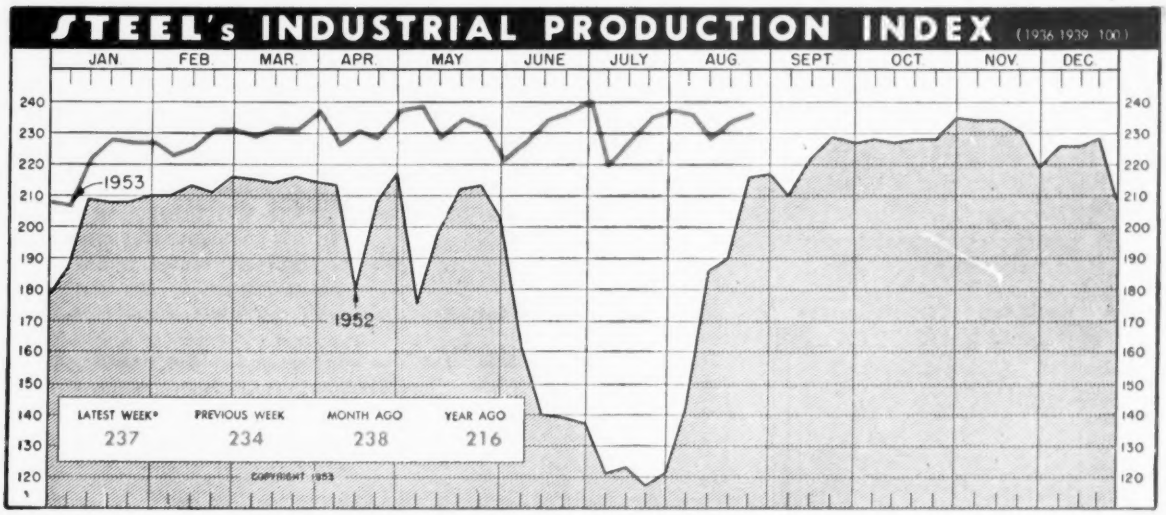
SHARON STEEL CORPORATION *Sharon, Pennsylvania*



*Week ended Aug. 22

Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automotive Assemblies (Wards' Reports) 20%

Rise in automobile and electric output pushes industrial production index closer to record. Employment and wages climb along with the expanded production

INDUSTRIAL production climbed 3 points on STEEL's index in the week ended Aug. 22 and came within 4 points of the all-time record set in the week ended June 27. Reaching 237 per cent of the 1936-1939 average, the index was only 1 point below the best week since the Fourth of July.

The rise came chiefly from increases in automobile outturn and electricity generation.

Auto Outturn Up . . .

Making the increase in auto output possible were jumps in production at Chrysler, Hudson and Ford. General Motors' outturn was down following the destruction by fire of its Livonia, Mich., transmission plant. Total production of passenger autos and trucks from U. S. and Canadian plants in the week ended Aug. 22 was 163,589 units, says *Ward's Automotive Reports*. This total exceeded that of the preceding week by 7063 units.

Canadian production of autos continued to hold up well. In the first seven months of this year Canadian output was 28 per cent ahead of 1952's record-breaking pace in the comparable period. And sizable gains have taken place in every postwar year.

Steel Output Steady . . .

To fill the steel needs of the automobile industry and other consumers, the steel industry poured 2,138,000 net tons of steel for ingots and castings in the week ended Aug. 29, the American Iron & Steel Institute estimates. This is 24,000 tons less than was produced in the preceding week.

Although output is still high, steel users are not as eager as they were to order far in advance of delivery date.

Power Surge . . .

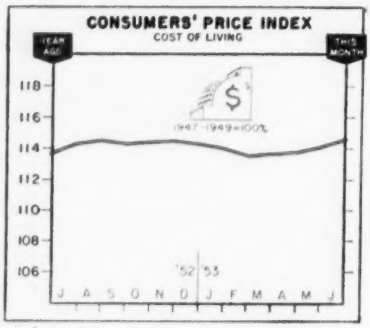
The 4.8 million net tons of steel made by electric furnaces during the first seven months of the year have contributed substantially to the demand for electric power. During the week ended Aug. 15, demand on the electric utility industry resulted in generation of 8,513,782,000 kilowatt-hours of electricity, the Edison Electric Institute reports. This output set a new record, and more new records are expected to come. Looking into the future, the electric utility industry hopes for the day when electrically-heated furnaces will supplant oil and natural gas-heated open-hearth furnaces. Then, the national output of electricity is expected to increase 12 per cent annually, the Battelle Memorial Institute says.

Coal Prospects . . .

When this occurs, coal production will be expanded by about 25 million tons a year, or a little more than three weeks' output at present levels. And since coal mining has been decreasing yearly, this prospect gladdens the heart of the industry. Coal output from Jan. 1 through Aug. 16 of this year continued downward. Production during this period totaled 277,625,000 net tons, a decrease of 10,816 net tons from the corresponding period in 1952, says the National Coal Association. Even though coal stocks on July 1 were 4.67 million tons lower than on the same date last year, these reserves are considered quite high, and purchasers are not expected to stockpile more coal unless notice of termination of the present miners' contract is given.

Freight Loadings . . .

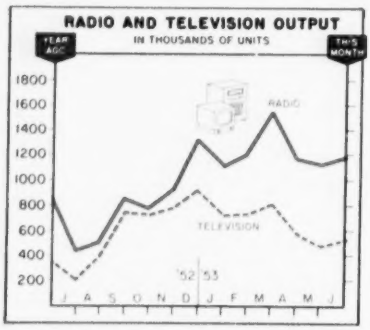
Along with the coal industry, the railroads are experiencing a lag



Consumers' Price Index
(1947-1949=100)

	1953	1952	1951
Jan.	113.9	113.1	108.6
Feb.	113.4	112.4	109.9
Mar.	133.6	112.4	110.3
Apr.	113.7	112.9	110.4
May	114.0	113.0	110.9
June	114.5	113.4	110.8
July	....	114.1	110.9
Aug.	....	114.3	110.9
Sept.	....	114.1	111.6
Oct.	....	114.2	112.1
Nov.	....	114.3	112.8
Dec.	....	114.1	113.1

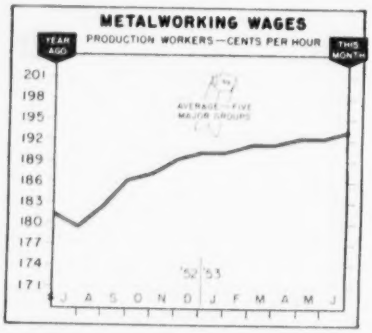
U. S. Bureau of Labor Statistics



Radio and Television Output
Thousands of Units

	Radio		Television	
	1953	1952	1953	1952
Jan.	1,093	632	719	405
Feb.	1,192	759	731	409
Mar.	1,549	976	810	511
Apr.	1,158	848	568	323
May	1,109	748	482	309
June	1,164	874	524	361
July	....	442	...	199
Aug.	....	544	...	398
Sept.	....	866	...	756
Oct.	....	772	...	724
Nov.	....	924	...	780
Dec.	....	1,325	...	921
Total	....	9,711	...	6,096

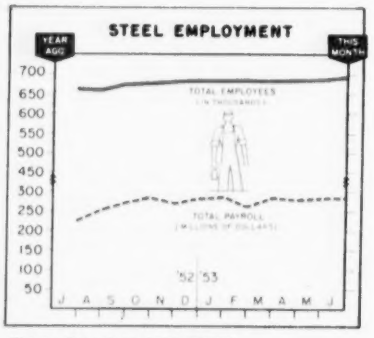
Radio-Electronics-Television Mfrs. Assn.



Metalworking Wages
(cents per hour)
Production Workers—Five Major Groups

1952	Prim. Mtls.	Fab. Prod.	Mach-inery	Elec. Mchy.	Trans. Equip.
July	181	170	184	166	192
Aug.	193	173	185	167	194
Sept.	199	177	187	168	201
Oct.	198	178	189	170	203
Nov.	200	179	190	170	204
Dec.	201	181	192	170	204
1953					
Jan.	203	181	193	172	203
Feb.	201	182	194	173	205
Mar.	201	183	195	173	205
Apr.	201	183	195	174	206
May	202	183	195	174	205
June	204	183	196	175	209

U. S. Bureau of Labor Statistics



Steel Employment, Payrolls

	in Thousands		in Millions	
	1953	1952	1953	1952
Jan.	684	672	$285.4	$252.2
Feb.	685	674	261.3	234.9
Mar.	683	672	281.0	242.7
Apr.	685	670	278.0	225.6
	6	662	281.0	223.1
June	690	*	282.1	*
July	....	*	....	*
Aug.	....	660	....	250.4
Sept.	....	674	....	269.4
Oct.	....	677	....	282.9
Nov.	....	680	....	269.7
Dec.	....	684	....	280.0

*Not available because of steel strike. American Iron & Steel Institute.

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Issue Dates on other FACTS and FIGURES Published by STEEL

Construction ..... Aug. 10	Gray Iron Castings July 20	Ranges, Gas ..... May 18
Durable Goods .... Aug. 10	Indus. Production.. Aug. 17	Refrigerators ..... Aug. 3
Employ. Metalwk.. Aug. 10	Ironers ..... Aug. 17	Steel Castings ..... July 20
Fab. Struc. Steel.. Aug. 10	Machine Tools .... Aug. 3	Steel Forgings .... July 20
Foundry Equip. .. July 27	Malleable Castings July 20	Steel Shipments .. June 22
Freight Cars ..... Aug. 24	Prices, Wholesale.. Aug. 24	Vacuum Cleaners.. Aug. 3
Furnaces, Indus... Aug. 24	Pumps ..... Aug. 24	Washers ..... Aug. 17
Gear Sales ..... Aug. 17	Ranges, Elec. .... Aug. 3	Water Heaters .... July 29

in demand and more competition.

During the week ended Aug. 15, the railroad industry carried 807,387 cars of revenue freight, 2.7 per cent below the corresponding week in 1951, in a continuation of a weekly downtrend from prior years' levels. However, the week ended Aug. 15 was 2.8 per cent above the preceding one.

Railroad Modernization . . .

In its modernization program, the railroad industry has made giant strides. In the first seven months of 1953, class I railroads installed 1409 new locomotive units. This is a decline of 508 from the comparable period in 1952, but this was expected. Of the 1409 new locomotives, all are diesel-electric except for ten steam and two gas turbine-electric units.

Employment Steady . . .

The industrial pace in mid-July was maintained by 49.4 million nonfarm workers, an all-time high for the month, says the Bureau of Labor Statistics. In registering this total, the number of employees remained unchanged between June and July, instead of showing the small decline usually reported at this time of year. Conversely, only 1.5 million were unemployed, the lowest number for any July since World War II.

Most of the 2.3-million gain in nonfarm workers over a year earlier was due to the increased demand for goods and services, although over a third of the rise reflected the effects of the mid-1952 work stoppage in the steel industry.

July employment in the machinery industry was at an all-time high for the month even though a slight downtrend in employment has been evident since spring.

Wage Record . . .

Complementing the employment picture, average hourly earnings of factory production workers in mid-July were at a record level of $1.77. These earnings were up 13 cents from July, 1952, and 1 cent from the preceding month.

From mid-June to mid-July, the manufacturing workweek declined

BAROMETERS OF BUSINESS

	LATEST PERIOD	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Output (per cent of capacity)[2]	96.0	96.0	97.0
Electric Power Distributed (million kwhr)	8,432	8,514	7,718
Bitum. Coal Output (daily av.—1000 tons)	1,596	1,565	1,631
Petroleum Production (daily av.—1000 bbl)	6,600[1]	6,595	6,283
Construction Volume (ENR—millions)	$259.0	$311.3	$1,366.1
Automobile, Truck Output (Ward's—units)	163,589	156,526	109,611
TRADE			
Freight Car Loadings (unit—1000 cars)	820[1]	807	834
Business Failures (Dun & Bradstreet, no.)	122	110	154
Currency in Circulation (millions)[3]	$30,145	$30,158	$29,068
Dept. Store Sales (changes from year ago)[4]	0%	+2%	+3%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$17,349	$15,546	$16,774
Federal Gross Debt (billions)	$272.7	$272.6	$263.0
Bond Volume, NYSE (millions)	$10.2	$11.6	$11.2
Stocks Sales, NYSE (thousands of shares)	5,043	5,058	4,747
Loans and Investments (billions)[4]	$79.8	$79.9	$75.6
U. S. Gov't. Obligations Held (billions)[4]	$32.3	$32.5	$32.5
PRICES			
STEEL's Finished Steel Price Index[5]	189.38	189.38	181.31
STEEL's Nonferrous Metal Price Index[6]	207.8	205.2	223.2
All Commodities[7]	110.8	110.5	112.2
Commodities Other Than Farm & Foods[7]	114.8	114.8	113.0

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1953, 2,254,459; 1952, 2,077,040. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

by 0.3 hour due to seasonal factors. But at 40.4 hours, the average workweek this July was about equal to the July, 1950, post-World War II peak for the month.

Farm Plight . . .

The farm section of the population has not benefited from the increased hourly earnings. Prices received by farmers are down about 10 per cent from the first of the year, and with estimated annual income at $17.8 billion in the first half compared with $20.2 billion in the 1952 period, income is down over 10 per cent. Accordingly, the Commerce department has found that farmers spent at least 10 per cent less for new plant and equipment in the first six months of the year than was spent in the comparable period last year. In line with the reduced capital expenditures of farmers, manufacturers of farm equipment have reduced operations appreciably. One large producer reports that farm equipment sales have declined 18 per cent.

New Financing . . .

An indication of the trend of over-all business conditions is provided by the amount of new financing. Although corporate securities offered for cash during the first half of the year continued at a high rate, having risen $0.6 billion above the first quarter to $2.7 billion during the second quarter, these offerings were down about $0.2 billion in the second quarter from the comparable period in 1952.

A shift among industries obtaining these funds became more evident during the second quarter also. New financing by manufacturing companies declined to almost half of what it was in the same period last year, while the funds acquired by commercial credit and sales finance companies rose to more than four times the amount floated in the second quarter of 1952.

Trends Fore and Aft . . .

There were 724 business failures in July, a postwar high for the month, Dun & Bradstreet says . . . Factory sales of standard size household vacuum cleaners in July totaled 159,446 units, according to the Vacuum Cleaner Manufacturers' Association. These sales were 19.3 per cent less than in June and 15.5 per cent less than the same month a year ago.

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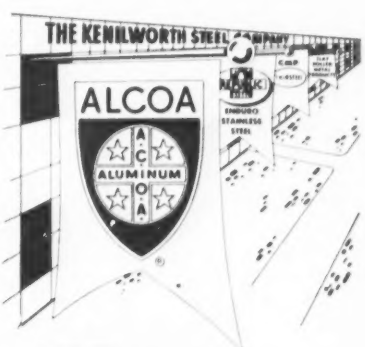

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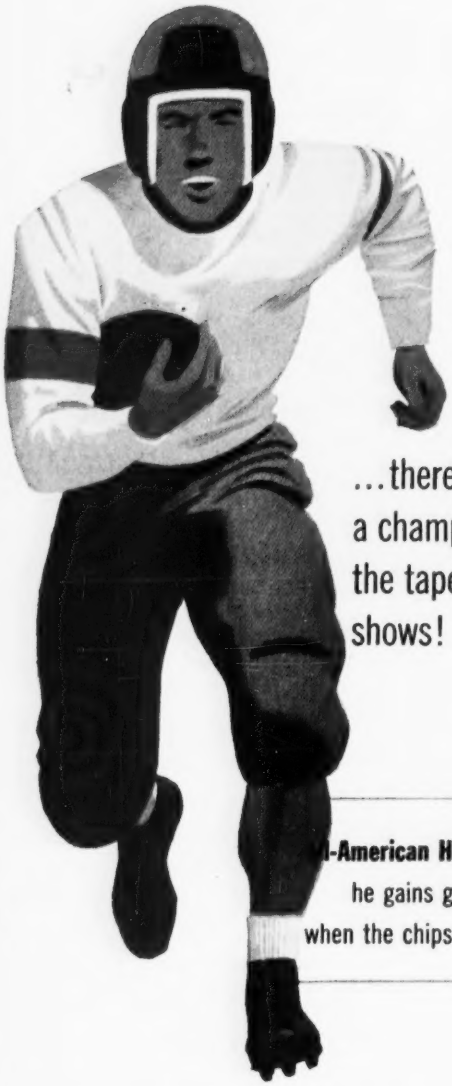

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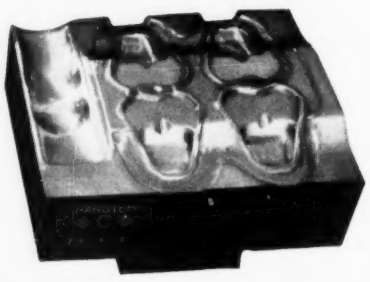

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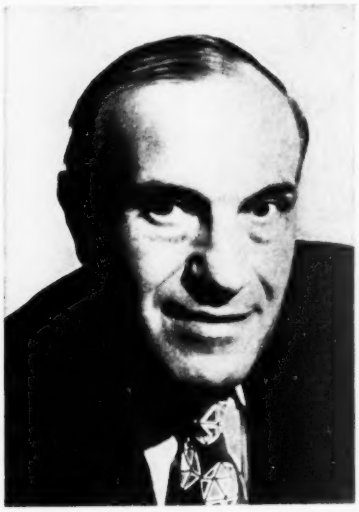

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D. L. SHARPE
. . . p.a. for Cleveland companies

JOHN H. HARPER
. . . a chief staff eng. for Acme Steel

R. K. LeBlond Machine Tool Co., Cincinnati, appointed **A. H. Davis** works manager. **D. W. LeBlond** became assistant works manager.

H. J. Holquist and **E. J. Richardson** were appointed assistant managers, cold-finished bar division, **Joseph T. Ryerson & Son Inc.** Mr. Holquist will make his headquarters in Chicago and Mr. Richardson in New York. Both will report to division manager, **A. P. Beckloff,** who will now supervise cold-finished bar sales as well as tubular products sales.

Raymond N. Gruber was named director of marketing research at **Standard Pressed Steel Co.**, Jenkintown, Pa. **Charles J. Betz** succeeds to the former's position of sales manager of the company's fastener line. **John W. Breitmayer** becomes assistant sales manager.

W. D. Sullivan, assistant works manager, tubular products division, **Babcock & Wilcox Co.,** Beaver Falls, Pa., was transferred to the company's boiler division as regional manager, manufacturing department.

Richard Wright was named president of **Penn Machine Co.**, Ferndale, Pa., succeeding **John Gibson Jr.** who will continue to serve as a director.

D. L. Sharpe became purchasing agent for **Cleveland Worm & Gear Co.**, and **Farval Corp.**, Cleveland, succeeding the late **A. G. Hopcraft. Dingle-Clark Co.**, district representative of Cleveland Worm & Gear Co. and Farval Corp., appointed **R. V. Robison** manager of the machinery division of the Cleveland territory. Replacing Mr. Robison as sales engineer in the Pittsburgh office is **L. B. Abrams Jr.**

Roger E. Bremer, director of purchasing, was promoted to assistant to the president of planning and programming at **Packard Motor Car Co.**, Detroit, and will report directly to James J. Nance, president. He is succeeded by **William H. Taylor,** previously with Tinnerman Products Inc. as general sales manager.

Dean M. Cochran was made assistant sales manager, **Hydraulic Press Mfg. Co.**, Mt. Gilead, O. In addition to administrative sales activities, he is also named manager of the metalworking and process press sales division.

Davey Compressor Co., Kent, O., appointed **Paul H. Nast** manager of the rock drill division. He will take charge of sales, engineering and manufacture of the Davey air tool line.

Acme Steel Co. appointed **John H. Harper** chief staff engineer of its plant in Riverdale, Ill.

Manufacturers' Industrial Supply Corp., Chicago, appointed **Robert W. Lyng** vice president in charge of sales.

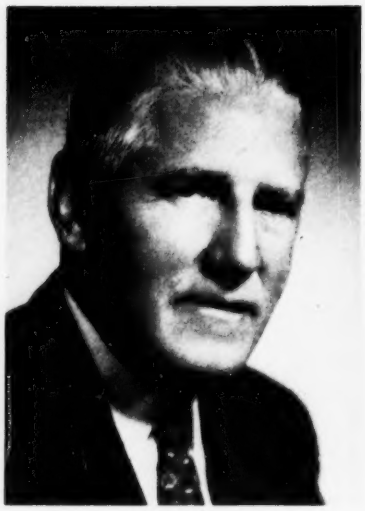
West Virginia Steel & Manufacturing Co., Huntington, W. Va., elected **Elmer Milby** vice president.

Charles C. Rieth, actively associated with the nonferrous metals industry for the last 25 years and from 1951 to April, 1953, in charge of nonferrous metals for the Office of Price Stabilization, has joined **National Lead Co.** and Nickel Processing Corp. He will be located at the New York office of the latter company.

Wilbert A. Rath joined the purchasing department of **Jack & Heintz Inc.**, Cleveland, to replace **Jack Mills** who has established offices as manufacturers' representative. Mr. Rath will serve as buyer of special electrical items and fasteners.

Dodge Division, Chrysler Corp., Detroit, appointed **John E. Brennan** to the executive staff of the president and vice president - general manager. His new assignment will be in addition to his present duties

JAMES M. KENNEDY



CHARLES A. MACFIE

RAYMOND P. WINBERG

. . . executives receive promotions at Revere Copper & Brass Inc.

as general manager of the Chrysler jet engine plant at Utica.

Peden Iron & Steel Co., Houston, appointed **Frank H. Roberts** manager of the steel department, succeeding **R. L. Phillips**, resigned. Mr. Roberts was formerly assistant manager of sales, Tennessee Coal & Iron Division, U. S. Steel Corp. **Herman A. Bartlett** was promoted to chief engineer of the reinforcing section of the steel department.

Fred Kaiser became manager of the eastern region of **Minneapolis-Honeywell Regulator Co.** with headquarters in New York. He succeeds **Arnold Michelson** who became resident vice president with headquarters in New York.

William J. Hennessy, sales supervisor, assumed responsibility for sales to the steel industry of all products of the metal processing department of **Pennsylvania Salt Mfg. Co.**, Philadelphia. **John M. Davidson** was assigned sales supervisor for all other sales of the department except phosphate coatings and lubricants.

Dearborn Motors Corp. and **Dearborn Motors Credit Corp.**, Birmingham, Mich., elected **Irving B. Babcock** president. He succeeds **Thomas A. Farrell** who resigned to become a vice president of **Ford Motor Co.** and general manager of the new Ford tractor division, Birmingham, Mich.

Election of **James M. Kennedy** as chairman of the board and chief executive officer of **Revere Copper & Brass Inc.**, New York, and of **Charles A. Macfie** as president, succeeding Mr. Kennedy, was announced. **Raymond P. Winberg** was named general sales manager to succeed Mr. Macfie and **Robert M. Lake** became vice president in charge of the Rome, N. Y., division.

Pollak Steel Co. appointed **Edward J. Baxter** works manager of its Marion, O., plant; **R. H. Knecht**, manager of production planning; **J. R. Rech**, director of facilities and mechanical development; and **Louie Cummins Jr.**, chief industrial engineer.

Pittsburgh Bridge & Iron Works Inc., Rochester, Pa., appointed **J. H. Lewis** manager of its erection department, effective Sept. 1.

Robert A. Gillies, vice president in charge of operations of **Steel Co. of Canada Ltd.**, Hamilton, Ont., retired. Succeeding him is **H. M. Griffith** who has been assistant to the president for the last two years. Other appointments announced are: **V. W. Scully**, vice president and comptroller; **C. M. Birkett**, assistant to the president; **R. H. Macdonald**, manager of the heavy bolt division.

Quentin E. Charlesworth joined **Bristol Steel & Iron Works Inc.**, Bristol, Va., as works manager, responsible to Henry Mills, production vice president. He was formerly with Bethlehem Steel Co.

Pheoll Mfg. Co., Chicago, appointed **David C. Eisendrath** works manager. He previously was chief manufacturing engineer.

Annin Co., Los Angeles, appointed **Henry C. Earle Jr.** sales manager.

Charles W. Kapplinger joined **Carboloy Department** of General Electric Co. as an engineer in the metallurgical process and quality control unit for permanent magnet materials at the Edmore, Mich., plant. He was formerly with American Ski Co., Clare, Mich.

Ford Division of Ford Motor Co., Dearborn, Mich., announced new management assignments and formation of three new product groups in the decentralization of Highland Park manufacturing activities. **N. F. Kroll** was made manager of the new rocket and parts machining plant; **C. F. Hancock** will manage the trim plant; and **C. L. Wallace** will be in charge of the paint and artificial leather plant. **L. E. Krieg** was made planning manager and **D. D. Cooper** plant services manager for the Highland Park area.

Harnischfeger Corp., Milwaukee, named **Frank C. Edwards** general manager of its diesel engine division plant at Crystal Lake, Ill. **Karl Schoeppner** was named works manager in charge of manufactur-

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A. R. ABELT
. . . Chain Belt Co. v.p.

WILLIAM R. STAPLES
. . . promoted by Carpenter Steel

R. CARTER DYE
. . . a market mgr., Reynolds Metals

ing. **J. F. Catalane** succeeds Mr. Edwards as sales manager of the small excavator division, and **Robert P. Jones** becomes assistant sales manager of the excavator division.

A. R. Abelt, formerly vice president in charge of field forces for **Chain Belt Co.**, Milwaukee, was appointed vice president-sales. **George W. Woodland** became manager of field forces for industrial divisions of Chain Belt, and **Gilbert J. Schuelke** is sales manager of the chain and transmission division. **W. C. Messinger** was named assistant to the divisional manager of the construction machinery division and is succeeded by **R. V. Krikorian** as manager of the ordnance division.

F. Robert Preece, for six years engineer for **Bethlehem Pacific Coast Steel Corp.'s** Los Angeles area, was appointed district engineer, fabricated steel construction, for the San Francisco area with offices in Alameda, Calif.

William R. Staples was promoted to manager of sales of Alloy Tube Division of **Carpenter Steel Co.**, Union, N. J. **P. L. Coddington** became assistant to the president at Alloy Tube Division.

Clarence H. Smith, formerly head of the Studebaker-operated aircraft engine plant in Chicago, was made assistant general superintendent of the **Studebaker Corp.** South Bend plants. **Ernest M. Riggleman** succeeds Mr. Smith in Chicago and **Guilford B. Cook** takes over Mr. Riggleman's position as daytime production superintendent in the Chicago plant.

Reynolds Metals Co. appointed **R. Carter Dye** manager, automotive market, and **Jules F. Saut** assistant manager, automotive market, with headquarters in the Detroit regional office. **Glen W. Goodloe** becomes assistant manager, transportation market, at the general sales office, Louisville.

John Reich was made factory manager of **Hyster Co.'s** Danville, Ill., plant. He was assistant factory manager at the Peoria, Ill., plant.

Brunner Mfg. Co., Utica, N. Y., announces assignments to its new plant under construction in Gainesville, Ga., as follows: **H. S. Hoefer,** general manager; **Charles C. Barnhill,** treasurer; **Victor Edmonds Jr.,** purchasing agent and material and control man; **Carl J. Wurm,** head cost man; and **A. G. Zumbrun Jr.,** sales manager.

Pivot Punch & Die Corp., North Tonawanda, N. Y., appointed **Edmund J. Klonowski** general sales manager of all divisions and **Frederick J. Rueger** to the new post of director of cost planning.

Norwood Webster was named New York sales representative for **Riverside Metal Co.**

New vice presidents of **Willys Motors Inc.**, Toledo, O., include **George L. Palmer,** director of finance; **George J. Edellstein,** director of purchases; **Leland L. Lord,** legal counsel; and **Leo McKay,** who will report to the executive vice president on special projects.

H. A. Rowbotham retires as director of purchases for **Belmont Iron Works,** Philadelphia, but continues with the company as a consultant. **Chandler C. Caton** was made purchasing agent.

Matthew M. Lawler was elected vice president in charge of the air conditioning and refrigeration division for **Worthington Corp.**, Harrison, N. J.

J. H. Matthews was appointed executive vice president, **Raybestos-Manhattan Inc.**, Passaic, N. J.

D. C. Sanford was made manager, application engineering department, **Bristol Co.**, Waterbury, Conn. **F. W. Borchers** was made general sales manager of the company.

Clark Langworthy was appointed chief engineer for industrial hydraulic products of **Parker Appliance Co.**, Cleveland. For the last 11 years he has been with Vickers Inc.

Triangle Steel & Supply Co., Vernon, Calif., appointed **Floyd A. Lewis** assistant general manager and **James F. McLaughlin** director of sales.

Wolverine Tube Division of Calumet & Hecla Inc. appointed **John R. Gavigan** as sales representative for southern Indiana and Kentucky with temporary headquarters in

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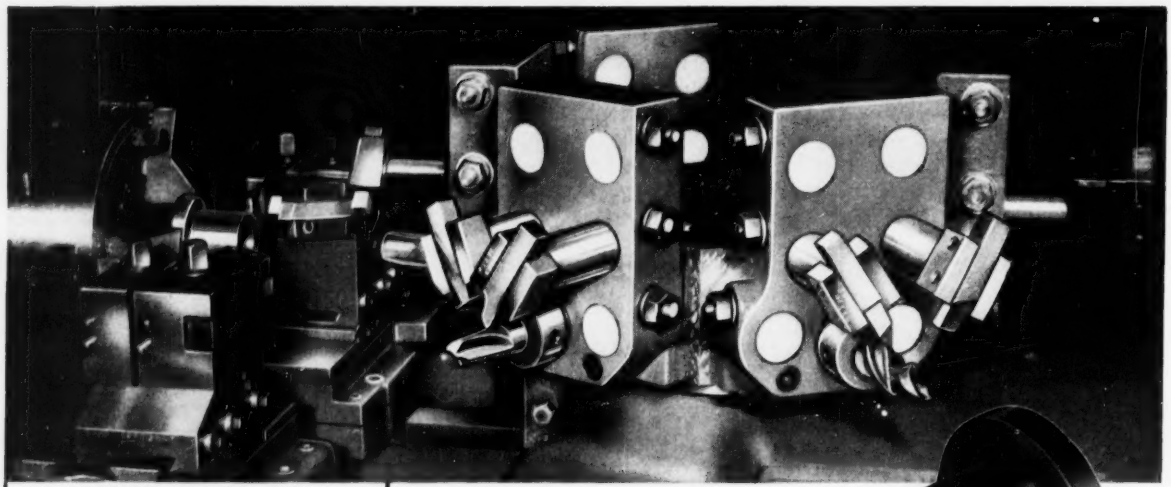
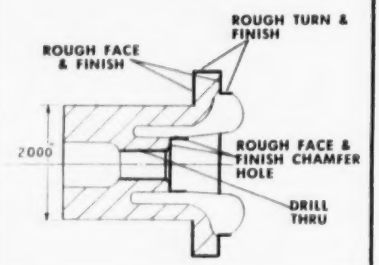
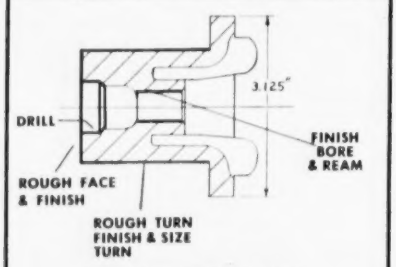
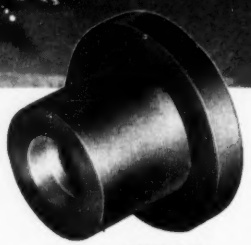


FIRST OPERATION
(PART CHUCKED ON 2" DIA. HUB)





SECOND OPERATION
(PART CHUCKED ON 3.125" O.D. OF BLANK)
HEAVY LINES INDICATE MACHINED SURFACES



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WILLIAM E. MAHIN
. . . technical director, Vanadium Corp.

RUSSELL J. DICKSON
. . . sales mgr. for Leschen Wire Rope

DONALD S. McCLEARY
. . . p.a., Continental Foundry & Machine

the company's Dayton, O., office. A branch office will be established later in Louisville.

William E. Mahin was appointed technical director of **Vanadium Corp. of America,** New York. Formerly a director of research for Armour Research Foundation of Illinois Institute of Technology, he will direct technical and research activities at Vanadium Corp.'s research center now under construction at Cambridge, O.

E. W. Gutgsell, formerly southwest division sales manager of **Cory Corp.,** Chicago, was named midwest division sales manager. He replaces **John Wallace,** now eastern division sales manager.

Russell J. Dickson was made general sales manager, **Leschen Wire Rope Division** of H. K. Porter Co. Inc., St. Louis.

D. J. Bracken was appointed general manufacturing manager, **Lincoln-Mercury Division,** Ford Motor Co., Detroit. He replaces **R. P. Powers,** resigned. Mr. Bracken has been vice president and general manager of Motor Products Corp.

Milton Tannenbaum joined **James W. Howden Co.,** Hawthorne, N. J., as administrative assistant.

Robert B. Warnock was appointed sales head of the **Birmingham Tank Co.,** division of Ingalls Iron Works Co., Birmingham.

Donald S. McCleary was named district purchasing agent by **Continental Foundry & Machine Co.,** Pittsburgh, succeeding the late **E. M. McNally.**

National Steel Car Corp. Ltd., Hamilton, Ont., elected **A. P. Shearwood** chairman of the board and chief executive officer. **H. J. Lang** was elected president.

De Laval Steam Turbine Co. appointed **Arthur L. Foltz Jr.** manager of the Detroit district office.

National Supply Co.'s engine division appointed **A. H. Candee** motive power consultant. He will make his headquarters in Pittsburgh.

OBITUARIES...

Donald H. Montgomery, 57, an executive of **New Britain Machine Co.,** New Britain, Conn., died Aug. 13. He was cofounder in 1927 of Gridley Machine Co. which two years later combined with the machinery business of New Britain Machine Co. to form New Britain Gridley Machine Co. This firm was absorbed in 1936 by New Britain Machine Co. and Mr. Montgomery was named vice president, a director and chief engineer, positions he held until his death.

Erskine Ramsay, 88, industrialist and coal mining inventor, died Aug. 15. He was board chairman and general consulting engineer, **Alabama By-Products Corp.,** Birmingham.

George A. Brockway, 90, founder, board chairman and former president, **Brockway Motor Co.,** Cortland, N. Y., died Aug. 17.

Sylvester M. Schweller, 58, chief engineer, **Frigidaire Division,** General Motors Corp., Dayton, O., died Aug. 14.

Fred T. Whiting, 63, vice president in charge of the mid-America region, **Westinghouse Electric Corp.,** Pittsburgh, died Aug. 20.

Otto R. Wollentin, 58, equipment design and development manager, **Westinghouse Lamp Division,** Westinghouse Electric Corp., Bloomfield, N. J., died Aug. 19.

Magnus M. Burgess, 56, president, **Sheller Mfg. Corp.,** Portland, Ind., died Aug. 14.

Walter W. Pitann, 66, chairman and founder, **Precision Scientific Co.,** Chicago, died Aug. 15.

Harry P. Serio, 64, founder and president, **Elmira Machine & Specialty Works,** Elmira, N. Y., died Aug. 19.

William J. Brewer, 56, director of purchases, **Buick Motor Division,** General Motors Corp., Flint, Mich., died Aug. 12.

Alcoa Expands Plant

Output of ingots, cable and extrusions being boosted substantially at Vancouver, Wash.

ALUMINUM CO. OF AMERICA, Pittsburgh, is rushing toward completion its current expansion program in the Pacific Northwest. More ingot casting facilities, cable-making additions and two large extrusion presses are included in the $5.6-million expansion at Vancouver, Wash., set for completion next year.

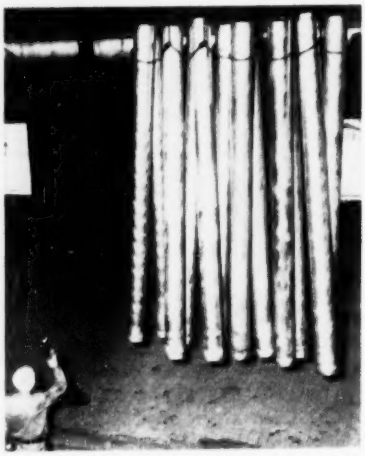
New ingot casting facilities, which will cost about $1,217,500, are partially completed. They will provide increased tonnages of commercial notch-bar ingots and rolling ingots, as well as extrusion, forging and other types of fabricating ingots for use by Alcoa's own operations and for sale to fabricating customers.

Capacity Climbs—These facilities will have capacity to produce about 6 million pounds per month of fabricating ingot in the form of sheet ingot, extrusion ingot and rolled rod ingot. Part of the sheet ingot tonnage will be shipped to Alcoa's mill in Davenport, Iowa, while part of the extrusion ingot tonnage will be shipped to the fabrication plant in Vernon, Calif.

Part of the extrusion ingot tonnage will be used eventually at the Vancouver Works. The company announced plans (see STEEL, Apr. 13, p. 100) for installation at a cost of $2.7 million of extrusion presses for production of alloy billets and extruded shapes. The products from these presses will be in both common and stronger alloys.

The first aluminum extrusion ingots produced in the Pacific Northwest are shown in the accompanying picture taken at Alcoa's Vancouver Works. Similar ingots will be used in production of extruded shapes at Vancouver on completion of the fabricating expansion.

These facilities will complement the cable mill which Alcoa opened in Vancouver three years ago and which are being enlarged at an estimated cost of $1,720,000. Additional cable-stranding machines and wire-drawing machines will double the capacity of this mill from 3 million pounds to 6 million pounds per month. The mill produces various sizes of multistrand aluminum cable and "aluminum cable steel - reinforced," known as "ACSR." Expanded ACSR, a recent development for supervoltage lines, also will be produced in the new facilities. In 1952 the mill shipped a combined total of 41.8 million pounds of aluminum weight in ACSR to customers and redraw rod to Alcoa plants and customers.



EXTRUSION INGOTS
. . . first from Pacific Northwest

Installed capacity for primary aluminum production at Alcoa's Vancouver Works is 170 million pounds annually. The company has five reduction lines at this plant and produces additional tonnages in the Pacific Northwest at Wenatchee, Wash., where three potlines are in operation.

Fluor Corp. Forms Affiliate

Fluor Corp. Ltd., Los Angeles, formed a new foreign affiliate, Fluor Peruana, S.A., with headquarters in Lima, Peru. Ximeno Tejada, formerly sales engineer in the New York office, is in charge of the Lima office.

Iowa Gets New Type Bridge

A prestressed concrete bridge was erected for the first time in Iowa near Allison in Butler county. Zeidler Concrete Products Co. built the bridge deck slabs at its Waterloo, Iowa, plant. Bridge superstructure beams of the post-tensioned prestressed concrete type get tremendous structural strength from a special steel wire developed by United States Steel Corp.'s American Steel & Wire Division, Cleveland. Sheaths of this wire are placed under tension and locked in the concrete beams to prevent failure under extreme loads.

Hanna Builds Ferronickel Plant

Foundations are under construction and ore handling equipment is being installed at M. A. Hanna Co.'s ferronickel reduction works at Riddle, Oreg. The company has a contract with the government for purchase of output from the new facilities.

Oliver United Buys Centriclone

Oliver United Filters Inc., New York, acquired all rights for manuture, sales and service in connection with Centriclone from the former owners, Equipment Engineers Inc., San Francisco. Centriclone is a combination of the conventional liquid cyclone and the centrifuge for separating solid particles of different sizes and specific gravities when suspended in a liquid slurry.

Allis-Chalmers Names Agents

Allis-Chalmers Mfg. Co., Milwaukee, named as distributors: For its motors, controls and drive equipment, Blair Electric Service Co., Altoona, Pa.; for its motors and control equipment, Jameson Machine Supply Inc., Lewiston, Idaho; for its motors, control equipment and transformers, Beaver Electric Co., Corvallis, Oreg.

Anaconda Moves District Office

Anaconda Wire & Cable Co., New York, will transfer its district office from Rochester, N. Y., to the Kemper building, Syracuse, N. Y., on Sept. 1. Morse E. Galliett continues as district manager, assisted by Bryn W. Waters, salesman.

Chain Belt Opens Warehouse

Chain Belt Co., Milwaukee, has opened a warehouse at 4125 Whitaker Ave., Philadelphia. The company makes power transmission and conveying equipment and con-

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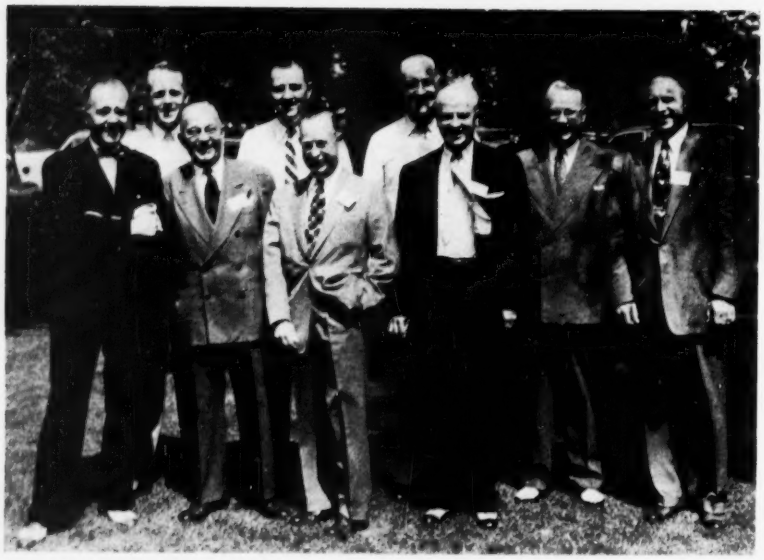
Boston	Detroit	Minneapolis	Providence	
Chicago	Houston	Newark	Rochester†	(†sales
Cincinnati	Indianapolis	New Orleans	St. Louis	office only)



Burgess-Norton Celebrates 50th Anniversary

Burgess-Norton Mfg. Co., Geneva, Ill., is observing its 50th anniversary this month. Representatives of the company's major supplier-firms were entertained on Aug. 11. They included the guests shown above on the company grounds. From left to right, first row: R. H. Warnecke, Wyckoff Steel Co., Pittsburgh; S. W. Terry, Monarch Steel Co., Indianapolis; H. W. Foege, Monarch Steel Co.; F. T. Birmingham, Federal Drop Forge Co., Lansing, Mich.; E. C. Rock, Wyckoff Steel Co.; S. W. Goodenough, American Steel & Wire Co., Cleveland. Second row: J. O. Hess, Ohio Seamless Tube Co., Shelby, O.; W. F. Meyer, Jones & Laughlin Steel Corp., Pittsburgh; C. M. Burgess, president, Burgess-Norton Mfg. Co.

struction machinery. William Sivyer, district sales manager, will head the warehouse activities. Located at the same address will be a newly created Rex construction machinery district office under Richard M. Leek.

Capitol Steel Building Plant

Capitol Steel & Iron Co., Oklahoma City, Okla., is in the process of completing its Houston fabricating plant at a cost of about $500,000.

Murray Appoints Representative

D. J. Murray Mfg. Co., Wausau, Wis., appointed Mac-Knapp Co., Chicago, as sales representative for its heaters and blast coils.

MonoRail Forms Divisions

American MonoRail Co., Cleveland, established division offices as follows: Eastern Division under W. P. Conway, Philadelphia; Cleveland Division under Frank L. Bateman; Detroit Division under C. L. Fell, Royal Oak, Mich.; and Chicago Division under C. E. Barner, Park Ridge, Ill. The company manufactures overhead monorail conveying equipment.

Binks Distributor Moves

Bay State Spray Equipment Co., Massachusetts distributor for Binks Mfg. Co., Chicago, moved to enlarged sales and service offices at 438 Dickenson Ave., Springfield, Mass. (headquarters office), and 4339 Washington St., Boston.

Gussett Boiler Boosts Capacity

Gussett Boiler & Welding Inc. moved into its new plant at 1545 Whipple Rd., Canton, O. New facilities will provide for a substantial increase in the company's productive capacity and permit numerous production refinements. The company is becoming an increasingly important producer of steel tanks, pressure tanks, pickling tanks, steel stacks, hoppers and bins and other fabricated steel equipment.

Arsenal Resumes Output

Ravenna Arsenal, Ravenna, O., for the first time since World War II days, is manufacturing percussion element cups and anvils. The percussion elements are used in general to detonate large-caliber shells.

Hall-Scott Gets Defense Work

Government contracts amounting to over $2 million have been received by Hall-Scott Motor Division, ACF-Brill Motors Co., Philadelphia. One order is for the manufacture of gun recoil mechanisms; the second, for production of ammunition. This materiel will be produced at Hall-Scott's Berkeley, Calif., plant. The Hall-Scott Division is a large manufacturer of internal combustion engines and is pioneering in the development and manufacture of liquefied petroleum gas engines. The division has participated heavily in production of defense goods.

Ford Opening Parts Depots

Three new Ford Division parts depots in a nationwide network will be put into operation during the next few months. The new plants will contain about 675,000 sq ft of floor space and will be occupied by parts supply and distribution facilities and by depot and sales personnel. The Chicago depot operations are scheduled to start in late September; the Pittsburgh depot operations, about Dec. 1. The New York area depot at Teterboro, N. J., is scheduled to be in full operation early in January.

Plans Copper Smelter in Canada

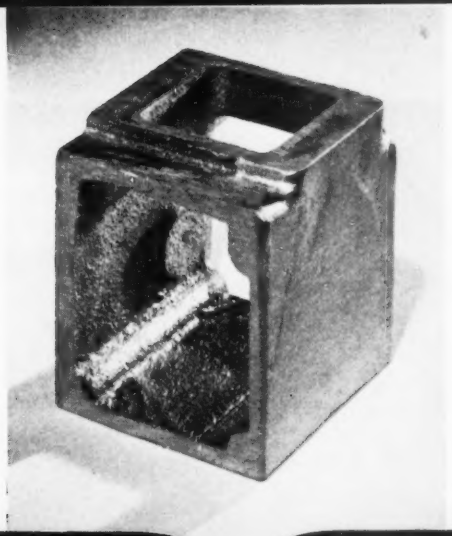
Campbell Chibougamau Mines, Quebec, Que., will build a $5.5-million copper ore processing plant in Obalski township in the Chibougamau area. Premier Duplessis says the provincial cabinet has authorized construction of the plant. Construction of another copper ore processing plant at Opemisca mines was announced recently.

Equipment Maker To Expand

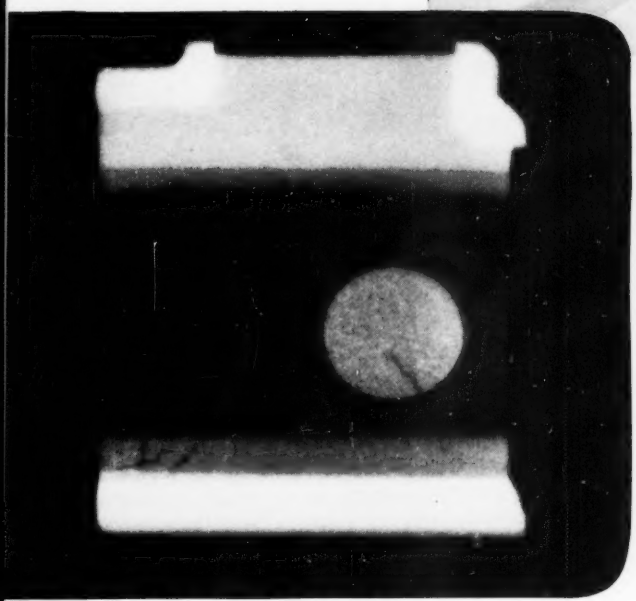
American District Steam Co. Inc., North Tonawanda, N. Y., is launching a major expansion program. Work has begun on a plant addition with 44,000 sq ft of floor space and another plant building of comparable size is planned

(*Please turn to Page* 63)

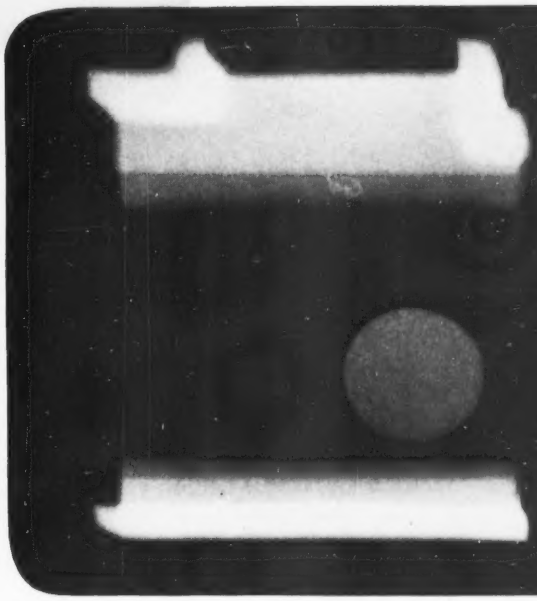
When shrink occurs...



Yield shrinks, too...



Radiograph shows recurring defects due to shrinkage.



A change in gating produced sound castings.

Radiography helps avoid shrink

Shrink can pose a real problem in casting 355 aluminum. It did with this instrument housing.

But radiographs of the pilot runs showed a recurring pattern of defects. This suggested a change in gating which quickly corrected the difficulty.

This is a typical reason why more and more foundries are making full use of radiography. It proves the soundness of their work—helps build a reputation for prompt delivery of good castings.

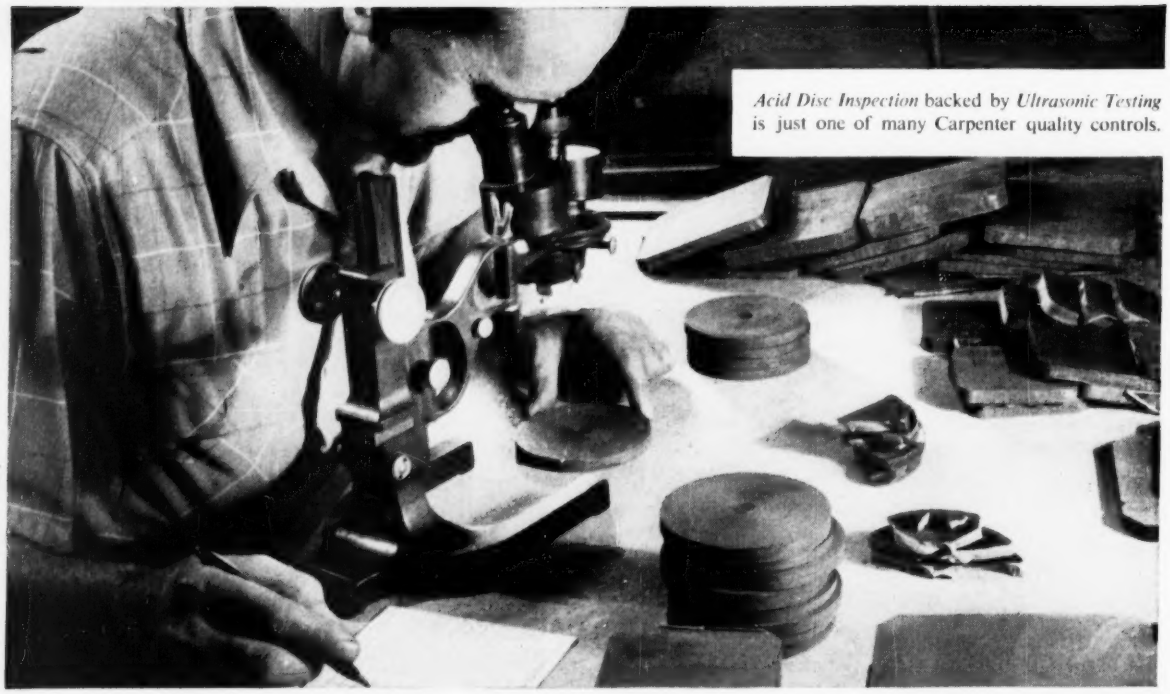
If you'd like details on how Radiography can improve your operations, get in touch with your x-ray dealer. Or, write us for a free copy of "Radiography as a Foundry Tool."

EASTMAN KODAK COMPANY
X-ray Division, Rochester 4, N. Y.

Radiography...

another important function of photography

Kodak
TRADE-MARK



Acid Disc Inspection backed by *Ultrasonic Testing* is just one of many Carpenter quality controls.

IF YOU USE TOOL STEEL, THESE ARE FACTS YOU SHOULD KNOW

When you make or use a tool or die you invest a sizable sum of money. And there are steps you normally take to protect your investment. You make sure the design is right. You follow through with accurate toolmaking and correct heat treating. But there is *one* factor involved in the success of your die, over which you have only indirect control. That factor is the *soundness* of the die steel you start with. After all, if the steel itself isn't right, you needlessly risk your entire investment.

How can you be *sure* the die steel you use has what it takes to assure good tools? The answer lies in the painstaking controls regularly practiced by the steel manufacturer. Listed here are the four important tool steel controls pioneered by Carpenter to give steel users like yourself the protection you need. Before you place that next tool steel order, ask yourself, "Does our steel supplier guarantee these four quality controls in the die steel we use?" Then remember: You can be *sure* of them when you specify Carpenter Matched Tool and Die Steels. And you don't pay anything extra! The Carpenter Steel Company, 139 W. Bern St., Reading, Pa.

4 Tool and Die Steel Developments *Pioneered by Carpenter* Help Carpenter Customers Cut Costs, Improve Die Performance

Since 1929:

HOT ACID DISC INSPECTION has been standard practice at Carpenter. To Carpenter customers it provides full assurance that Matched Tool and Die Steels are internally sound, shipment after shipment.

Since 1930:

The TOUGH TIMBRE TEST has assured Carpenter users a wider safe hardening range, greater dependability in performance.

Since 1933:

The TORSION IMPACT TEST has provided Carpenter Matched Tool and Die Steel users with more complete heat treating information that leads to better tools and dies.

Since 1940:

The CONE TEST, used to check and control hardenability of Carpenter water-hardening Matched Tool and Die Steels, has made sure that sections of the same size have uniform hardness penetration in lot after lot.

Carpenter STEEL

Matched Tool and Die Steels

Export Department: The Carpenter Steel Co., Port Washington, N.Y.—"CARSTEELCO"

Mill-Branch Warehouses and Distributors in Principal Cities Throughout the U.S.A. and Canada

(*Continued from page* 60)
for 1954 or 1955, says John L. McGara, vice president and general manager. The company makes steam distribution equipment.

American Cam Co. Expands

American Cam Co. completed transfer to its new quarters at Bloomfield, Conn. The building will house the company's general offices, drafting room and inspection department in addition to increasing its manufacturing space. George Chase, president, points out that in addition to expanding facilities and employment about 20 per cent, plant layout and work flow will be improved, resulting in an estimated production increase of 33 per cent. The additional production will be utilized to broaden the company's line of cams, tools and accessories for automatic screw machines. Manufacture of special purpose cams and eccentric contours will be continued at the new plant. The mailing address of the company is Hartford 1, Conn.

Rampe Opens Additional Plant

Rampe Mfg. Co., Cleveland, opened an additional plant at 8404 St. Clair Ave., that city. Manufacture of all tumbling equipment will be concentrated in the new plant. All other products, including deburring equipment, will be made in the original factory at 3320 St. Clair Ave.

Production Pool Formed in West

A small business production pool was incorporated as United-Western Manufacturers Inc., Inglewood, Calif. It is composed of firms in the Los Angeles area. It will seek defense contracts in the metal trades industry, particularly sheet metal fabrication as applied to the airframe industry, precision machine parts, engineering research design and development, specialized tools and tooling, metal finishes and finishing and the design and development of electromechanical equipment. Members of the pool are: Aircraft Division, Calnevar Inc.; Certified Welders & Engineering Co.; Modern Plating Co. and Tubing Appliance Co. Inc., all of Los Angeles; Harford Mfg. Inc., Culver City, Calif.; Telair Engineering, Inglewood, Calif.

Link Aviation Leases Building

Link Aviation Inc., Binghamton, N. Y., will take over its fifth factory building in that city in two years to meet the firm's expanding space requirements. A lease has been signed for a structure at 85 Eldredge St. with 8000 sq ft of floor space.

Majestic Opens Sales Branch

Majestic Radio & Television Division, Wilcox-Gay Corp., Brooklyn, N. Y., opened a factory sales branch, to be known as Majestic Television Distributors Inc., at 1103 Columbus Ave., Boston. Manny Rosen is manager of the new branch. Louis Jesser was appointed district sales manager for Majestic television and radio in the states of Wyoming, Colorado, New Mexico and in the county of El Paso, Tex.

Gets Tilting Arc Contract

Pacific Airmotive Corp., Burbank, Calif., will manufacture several hundred Rohr Aircraft Corp. tilting arcs worth approximately $500,000 within the next 13 months. The tilting arcs are manufactured and sold by Pacific Airmotive Corp. under an exclusive licensing agreement with Rohr Aircraft Corp. They facilitate handling of engines, engine assemblies and complete engine nacelles.

Size Control Appoints Agents

Size Control Co., Chicago, appointed Muratet & Co., Tulsa, Okla., as its representative in that territory. Size Control, a division of American Gage & Machine Co., manufactures inspection gages and centerless lapping machines.

Standard Equipment Expands

Standard Equipment Co., Wilkes-Barre, Pa., is planning erection of a building to house office, display room and shop on Hanover street. It will replace the firm's present headquarters on Horton street as well as storage space in three other locations. The structure will cost between $250,000 and $300,000 and is scheduled for completion by next April. The firm deals in heavy construction machinery.

Speeds Unloading

A new 50-ft boom crane unloads copper wire bars from a barge at Anaconda Wire & Cable Co.'s mill at Hastings-on-Hudson, N. Y. With the new crane, lifting 20 tons at a time compared with 7½ tons for the replaced crane, three men can clear a bargeload of 1 million lb in about five hours

Scully-Jones Names Agents

Scully-Jones & Co., Chicago, appointed as stocking distributors of its precision holding tools: E. A. Kinsey Co. Inc., Dayton, O.; James H. Cross Co., Erie, Pa.; Harris Pump & Supply Co., Pittsburgh.

Builds Magnesium Truck Bodies

White Metal Rolling & Stamping Corp., Brooklyn, N. Y., started production of magnesium trailer type truck bodies at its Bethel, Conn., plant, following more than a year of road testing of experimental bodies.

GE To Build $5-million Plant

A $5-million plant will be built by General Electric Co., Schenectady, N. Y., at Bloomington, Ill., to manufacture general purpose controls for industrial use. More than $2 million worth of equipment will be installed in the plant. Bloomington will be the headquarters for the company's general purpose con-

(*Please Turn to page* 66)

Coming November, 1953

The editors of STEEL announce this new editorial service for metalworking men in plants doing production machining.

Approximately 500 machine tool manufacturers and 2,000 machine tool users have combined their know-how with that of STEEL's editors to bring you right-now information on:

. . . what to look for when you are modernizing your plant to meet the competitive challenges of more and better product at lower unit cost.

. . . what constitutes a workable equipment replacement program: How many companies are employing programs of this type? How can the MAPI formula be used most effectively?

. . . what machining techniques are gaining in usage? New production processes? Tooling? Machine Tool design features?

. . . what to look for in evaluating your new machine tool requirements. *Who* makes *what* machine? Where can specific machines be purchased?

Here is a publication you can put right to work. It's designed to help you do your job easier and better . . . and in much less time.

As a STEEL subscriber, you will receive a copy of the Machine Tool Buyers' Guide in November, 1953 without extra cost. If you are not now a subscriber to STEEL, you will want to enter your subscription at once so that you will be certain to get a personal copy of the Guide.

To help you plan for more efficient production...

13 Major Machine Tool Classifications will be included in the BUYERS' GUIDE

Boring and Drilling Machines
Broaching Machines
Gear Cutting and Finishing Machines
Grinding Machines
Honing and Lapping Machines
Polishing and Buffing Machines
Lathes
Milling Machines
Planers
Shapers and Slotters
Cutting, Sawing and Filing Machines
Tapping and Threading Machines

Other Machine Tools

More than 20,000 individual machine tool entries (by type, size and manufacturer) will appear in this section.

8 SPECIAL TREND REPORTS based on data received from 2,000 machine tool users will help solve your production problems . . .

1. **Production Methods**
. . . will report trends in relative position of machining to stamping, cold extruding, forging, powder metal forming, production welding, shell molding, die casting, etc.

2. **Machining Methods**
. . . will give a graphic picture of the trends and growth in use of turning, milling, grinding, boring and drilling, etc.

3. **Tooling**
. . . will focus attention on trends toward superspeed turning, milling and broaching, use of carbide tooling, high speed tooling, negative rake machining, contour machining, automatic gauging.

4. **Machine Tools**
. . . will report trend toward use of special machines, standard machine with special tooling, more automation or work transfer and handling devices.

5. **Machine Tool Features**
. . . will report preferences of users for such design features as types of bases, mounting ways, controls, feeds, drives, tracer control motors, checks, chip handling systems, lube systems, etc.

6. **Machining Capacity**
. . . anticipated capacity expansion in 1954 and by 1960 will be measured and reported in relation to 1953 capacity.

7. **Equipment Replacement**
. . . will report on equipment replacement formulas and how to use them, successful replacement programs now in use, who is in charge, what amortization period is most satisfactory, trends in machine tool rentals.

8. **Machine Tool Purchases**
. . . will report on the kind of machines now in use by metalworking plants doing production machining, those they expect to buy, who decides on purchases, how many machines are currently owned.

Advertising Space reservations for this issue must be in by September 8th.

(*Continued from page 63*)
trol department. All engineering, sales and manufacturing operations will be located there under the direction of William F. Oswalt, general manager of the department.

Plans Magnetic Research Work

Indiana Steel Products Co., Valparaiso, Ind., maker of permanent magnets, was awarded a contract by the Air Force to conduct a comprehensive research program on magnetics to improve military air and ground devices utilizing magnets. The contract was sponsored by Wright Air Development Center of the Air Research & Development Command.

The program will include both basic and applied research and will cover the theory of magnetism, the source of magnetic energy and factors affecting magnetic induction and coercive force, as well as design, application and a search for new magnetic alloys. Charles A. Maynard, the company's vice president in charge of research and engineering, will be in charge.

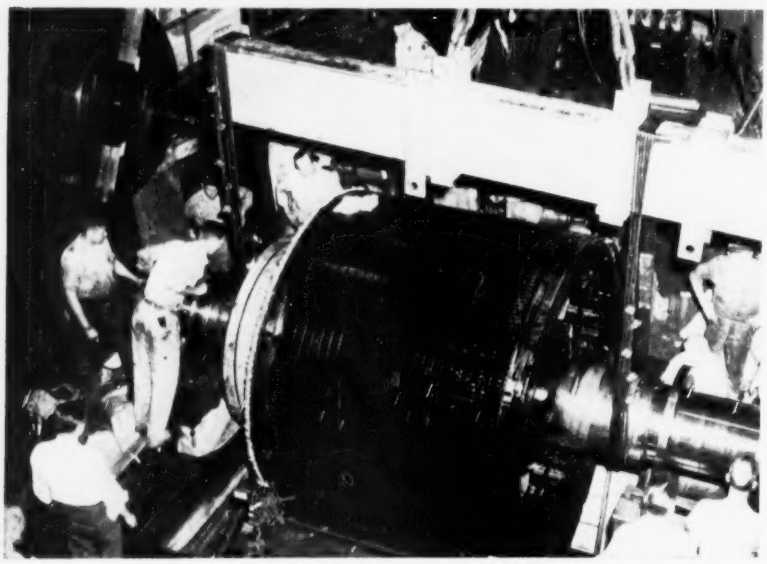
The research project will be conducted in part of the space provided by construction of an addition to the Valparaiso plant. A laboratory to be established in the addition will contain equipment necessary for various phases of the complex research program. Technical equipment of the company will be supplemented by equipment provided by the Air Force, and additional equipment will be purchased as needed, says Robert F. Smith, president.

GE Forms Two New Departments

General Electric Co.'s Component Products Division, Schenectady, N. Y., formed a specialty transformer department and a ballast department, dividing the former specialty transformer and ballast department into two separate organizations. Carl H. Rinne is general manager of the specialty transformer department with headquarters in Ft. Wayne, Ind. Charles P. Hayes is general manager of the ballast department with headquarters in Danville, Ill.

California Plating Works Moves

California Plating Works Inc. moved its plant to 405 N.W. 16th Ave., Portland, Oreg.



GE Team Completes McLouth Steel Project

One of two rotors used in the main twin-drive slabbing mill motors at McLouth Steel Co.'s plant at Trenton, Mich., is shown being lowered into place after overhaul was completed recently. Clearances here were 0.003 in. A team of 133 General Electric engineers and technicians overhauled and rebuilt major electrical equipment in McLouth's two plants at Trenton and Detroit without loss of an hour's output of steel. They worked 12 hours a day for nine days

Cavert Wire Appoints Agent

Cavert Wire Co., Uniontown, Pa., manufacturer of baling wire and bale ties, appointed M. & A. Steel Sales & Service Inc. as its West Coast representative.

Crucible Completes Office Shift

Crucible Steel Co. of America completed moving its general offices from New York to Pittsburgh by holding a board of directors meeting in the Oliver building, Pittsburgh, last week.

Crucible's offices were moved from Pittsburgh to New York's Chrysler building in 1921. The return began in 1945 when metallurgy and purchasing departments were located in Pittsburgh. Sales headquarters were transferred to Pittsburgh in 1949.

New offices are occupied now by W. P. Snyder Jr., chairman, and W. H. Colvin Jr., president. In welcoming visitors to the offices, Mr. Colvin stated that Crucible plans to round out its production of finished items such as stainless and tool steels in the next few years.

Seaporcel Opens Regional Office

Seaporcel Metals Inc., Long Island City, N. Y., porcelain manufacturer, established a regional office at 1222 Peachtree St., Atlanta. The office is under the supervision of Jerome R. Salton. Seaporcel's other regional offices are located in Boston and in Silver Springs, Md. The company maintains a West Coast plant in Long Beach, Calif.

Seaporcel products include porcelain panels for buildings, tunnel ceilings, nonstructural bulkheads, flue linings, ect.

U. S. Rubber Opens Branch

United States Rubber Co., New York, formally opened its Denver branch at 4800 Colorado Blvd. The company also announced appointment of Earley Sales Co., Paterson, N. J., as its agent for the sale of electrical tapes in that area.

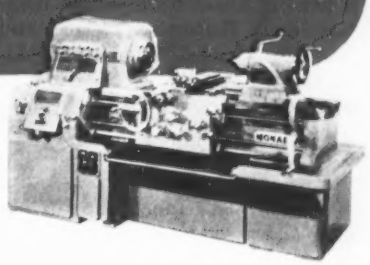
Stalwart Buys Jasper Rubber

Stalwart Rubber Co., Bedford, O., purchased Jasper Rubber Co., Jasper, Ga. The acquisition involved $500,000 and is another step in Stalwart's expansion program to facilitate the production

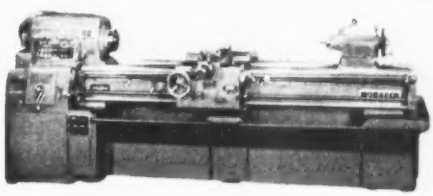
MONARCH SERIES 60 LATHES

1. Totally enclosed gearbox and end gearing — for sustained accuracy
2. Automatic pressure lubrication — for long life at original efficiency
3. All anti-friction bearings — for peak power and reduced maintenance
4. Hardened, ground or shaved, wide helical gears in headstock — for precision power, easier shifting
5. American Standard Camlock Spindle Nose — for quick, rigid chuck and fixture mounting
6. Flame-Hardened and Precision-Ground Integral Bedways — for sustained accuracy throughout the life of all four ways
7. All critical parts made of hardened alloy steel — for long, trouble-free life

To get Utmost Value OUT OF YOUR LATHE— Buy Series 60 Value BUILT INTO your Lathe



Monarch Series 60 Engine Lathe. Series 60 models are furnished in 13", 16", 20" and plus-swings.



Monarch Series 60 Toolmaker's Lathe. All Series 60 Models are furnished in a wide variety of bed lengths.

Isn't it logical? Aren't the costs and quality of your products directly affected by the sustained accuracy, speed, versatility and dependability of your turning equipment?

So look over the Monarch Series 60 product features listed above (bearing in mind that almost all of them were Monarch pioneered). Check the extra strength, weight and power of the machines, making them, within their rated capacity, fully capable of sustained heavy production. Then look over the wide choice of accessory equipment that lends such versatility to the basic Engine and Toolmaker's models. This includes (with Monarch only!) choice of three types of Tracer Controls — including the Air-Gage Tracer which, with further addition of the Auto Cycle Unit, gives you a fully automatic cycle high production unit.

For utmost lathe value for toolroom, production line or maintenance shop — look into the Monarch Series 60! Let us send our Booklet No. 1113 with complete information. Just write! . . . . *The Monarch Machine Tool Company, Sidney, Ohio.*

Monarch
TURNING MACHINES
ACCURACY • ECONOMY • LONG LIFE

FOR A GOOD TURN FASTER TURN TO MONARCH

New Switchers Cut Costs for Sharon Steel

Replacing its steam locomotives with eight diesel-electric units has produced a large saving in railroad operating costs for Sharon Steel Corp., Sharon, Pa. On the cinder run, one of the Baldwin-Westinghouse switchers positions the "thimbles" at the blast furnace and hauls the slag to the dump where it tips the thimbles electrically. Another job is to spot coke cars on the blast furnace trestle

of custom engineered rubber parts for industry. The Jasper plant will be operated as a subsidiary of the parent organization. H. W. Osborn is president.

Swift Heads Electroplaters

Dr. George P. Swift of Waltham, Mass., was elected national president of American Electroplaters Society, Newark, N. J. Dr. Swift is head of his own consulting laboratories in Watertown, Mass., and has been a metal finishing consultant since 1930.

Skagit Steel Plans Expansion

Skagit Steel & Iron Works, Sedro-Wolley, Wash., fabricator of logging and other equipment, plans a $3-million plant expansion. The company received an Army contract for the manufacture of 105-mm shell casings. Amount of contract is classified, but is said to assure plant operation for a minimum of 18 months. The government will supply part of the equipment.

Pen Firm To Build Factories

Paper-Mate Pen Co. Inc., Los Angeles, will construct two additional factories in that city. The three-year-old firm's $30-million-yearly worth of fountain pen production is concentrated at a five-building plant in Culver City, Calif., and at another plant in Puerto Rico.

Planning Firm Changes Name

"Visual" Planning Equipment Co. Inc., Oakmont, Pa., changed its name to "Visual" Plant Layouts Inc. The company makes layout models and templets.

Berger Mfg. Names Distributor

Eshelman Supply Co., Lancaster, Pa., was granted a distributorship for Republic steel kitchens, made by Berger Mfg. Division, Republic Steel Corp., Canton, O.

Industrial Metals Moves

Industrial Metals & Products Co. moved into its new offices at 1049 E. 20th St., Erie, Pa.

Allied Joins Production Pool

Approval of Allied Specialties Co., Philadelphia, to enter into national defense contracts on a pool basis was announced by the Small Business Administration, Washington. Participating companies are Barta Machine Co., Comly Machine Co., Eastern Non-Ferrous Foundry, Emerald Tool & Die Co., Industrial Specialties Co., Kosempel Mfg. Co., H. J. Perazzoli & Co., Quaker Storage Co. and W. W. Wichterman & Co., all of Philadelphia.

TRAFFIC CONTROL

(*Concluded from page* 41)

transfer points, it often enables a company to sell in a market closer to plants of a competitor. Small businesses benefit particularly by having a clearing house for pool shipments to gather and fan out in an area. Pooled shipments from Waterbury to Chicago now go through in three days; before the plan went into effect (March, 1951) the normal range was 6 to 20 days.

Originator—Changes in quantity increases on railroad shipments put into effect last May were initiated by the brass industry and generated in large part by Mr. Griffin. His approach to carriers petitioning for rate increases is not blind opposition but objective questioning—do the carriers need an increase, and if so how much to put them on a paying basis? This approach was used by Mr. Griffin in rate hearings before the Interstate Commerce Committee while he headed the Copper & Brass Research Association's Traffic Committtee.

Between telephone calls from customers and vendors around the country, Mr. Griffin finds time in the afternoon to inspect progress on the new warehouse with W. J. Morrison, assistant superintendent of traffic. On a quick trip to the continuous strip mill and extruded rod mill he checks the status of outgoing brass shipments. A Griffin packaging innovation is shipping rod in open cars in bundles wrapped with waterproof shrouding. Rod can be loaded and unloaded easily, yet reaches its destination clean and untarnished.

Delegator—Back in his office, a hurried consultation with traffic assistants R. M. Tice and J. W. Bracken takes place. Mr. Griffin believes in delegating authority and leaving his assistants alone to develop initiative. Education is a great need and more schools should offer transportation courses, he has found. A trained college-level man with ability to analyze and make decisions is ideal, he believes. Says Jim Griffin: "A good traffic man is not just a plug in a hole."

● *This is the eighth in a series on what various types of executives do in a typical day. The last one, on a salesman, appeared July 20, p. 54.*

It's outstanding!

EVERY MANUFACTURER who tries Roebling high carbon flat spring steel discovers the same thing... that this spring steel is absolutely unexcelled for dimensional and mechanical uniformity... for speeding production and cutting down rejects.

You always *pay* for the best when you buy flat spring steel... make sure you *get* it by specifying Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.

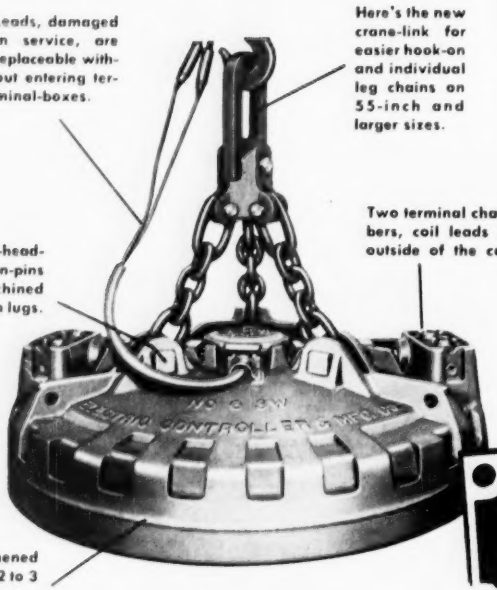
Empire State Building, world's tallest building.

ROEBLING

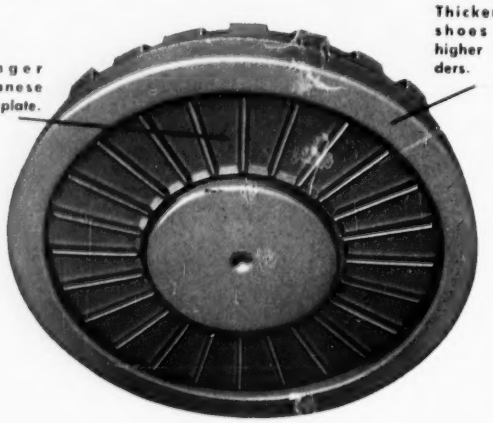
A subsidiary of The Colorado Fuel and Iron Corporation

BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, TRENTON 2, N. J.

BETTER and FASTER LIFTING with *Improved-Design*


Leads, damaged in service, are replaceable without entering terminal-boxes.
Here's the new crane-link for easier hook-on and individual leg chains on 55-inch and larger sizes.
Two terminal chambers, coil leads on outside of the coil.
Square-headed chain-pins in machined holes in lugs.
Strengthened welds (2 to 3 times stronger).

TYPE SW *All-Welded* LIFTING MAGNET
SIZE ____ SER. ____ FOL. ____
____ PERCENT TIME ON ____



EC&M developed the *All-Welded* lifting magnet, which by eliminating pole shoe bolt recesses, gave a better proportion of coil space. Now, new insulating materials are used for further improvement of the coil. Between turns, new purer asbestos tape is thinner because of its improved quality; and impregnated with EC&M 281 liquid to increase its mechanical strength. For use between layers, EC&M has developed ECAMICA Board having high dielectric strength and excellent mechanical durability. ECAMICA Board is far superior to any previous insulation used in lifting magnets.

ECAMICA Board—an EC&M development of major importance for insulation between coil-layers.

FOR COMPLETE FACTS, **write for your copy of Bulletin 900 describing EC&M Type SW ALL-WELDED Lifting magnets.**

THE ELECTRIC CONTROLLER & MFG. CO.
2698 EAST 79TH STREET ★ CLEVELAND 4, OHIO

Technical Outlook

FORGING IN MID-AIR— Principle of the Chambersburg impacter, now being used to make jet engine blades, soon will be extended to forging of scissors, hand tools, pliers, etc. Parts will be automatically conveyed through Selas gas-fired furnaces to impacter. Provisions also are being made to forge ferrous metals in reducing atmospheres to control scale. Another application being explored: Forging titanium in inert atmospheres.

COMING UP— Bureau of Mines will push its work to develop methods for converting lean domestic ores into substandard ferrochromium and ferromanganese. Theory: It's cheaper and more desirable in some cases to use lean ores to make ferroalloys with lower alloy content instead of concentrating ores to make standard grades. Steel companies using samples of 50 per cent ferrochromium produced by the bureau report good success in manufacture of alloy steels to which it is applicable.

SOFTER RIDES— Extra protection for fragile freight cargoes is afforded by new-type boxcars whose bodies are connected to underframe by a movable shock-absorbing device. Ten of the cushion-underframe cars, jointly developed by Western Pacific Railroad Co. and Pullman Standard Car Mfg. Co., have been ordered by the former.

NEWCOMER— British-developed "Fortiweld," a low carbon, molybdenum-boron steel, is being explored by Kaiser Steel Corp. Containing Si 0.21 per cent, Mo, 0.49 per cent and B, 0.002 per cent, it is being rolled into sheets, plates and structurals. Coiled sheet (0.130 inch) has yield strength of nearly 79,000, tensile strength approaching 92,000.

TITANIUM CASTINGS— Mark up another milestone for titanium. Cast shapes of the metal now can be produced. Special vacuum melting furnaces, casting procedures and mold materials capable of withstanding attack by molten titanium have been developed by National Research Corp., Cambridge, Mass. Castings of complex shapes weighing up to several pounds, with surface equal to that of good sand-cast metals, are turned out. Carbon, oxygen and nitrogen content are reasonably comparable with commercially-wrought titanium.

HOT STRETCH— Electric furnace is suspended between cross heads of a standard tensile tester to heat high-temperature alloy test coupons at Haynes Stellite Co., Kokomo, Ind. For automatic heat tolerance within 10°F, hot junction of the thermocouple is attached to center of specimen in furnace. Extensometer measures and records elongation as load is increased. Ultimate strength is read directly from machine dial.

TITANIUM COATING— Inert silicide coating extends usefulness of titanium and its alloys in air by a factor of 20 or more at temperatures up to 1832°F, according to Fansteel Metallurgical Corp., North Chicago, Ill. Silicon powder, plus an organic binding substance, is applied by brushing, dipping or spraying. After liquid is volatilized, specimen is heated in an inert atmosphere or vacuum. Normal hard and brittle coating, about 2 mils thick, is dense, well bonded and has a dull metallic luster.

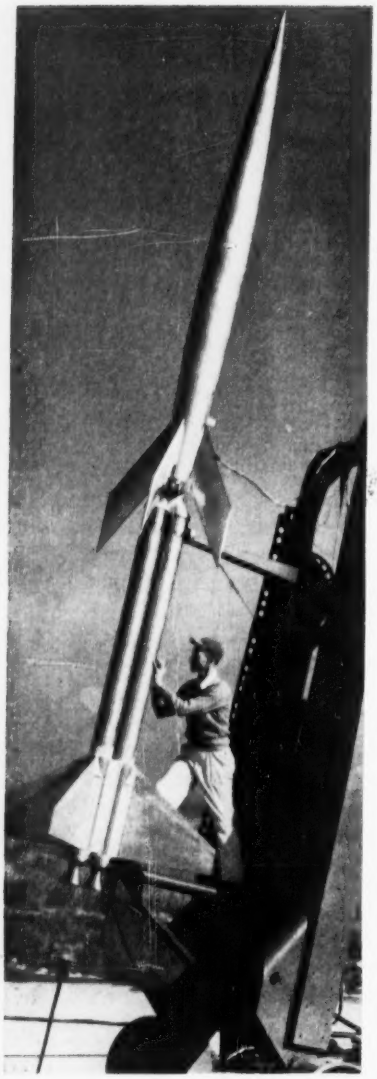
WHAT'S ON THE INSIDE— Not too many metallurgists are involved in it yet, but heat problems and their effect on metal strength are beginning to worry aircraft people. You can see why on p. 72. . . Here they are, at long last! Some mechanical testing standards that are really standard, p. 75. . . Machining gears isn't so expensive on tools when you harden teeth later. How Monarch does it is on p. 94. . . Smoke control may be one of your problems. There's one less offender in Los Angeles. Story's on p. 78. . . Some think that glamorized lift trucks are designed just for show. Clark says no, on p. 82.

Metalworking Outlook—p. 21 Market Outlook—p. 99

Sonic Barrier

RAISES HEAT BARRIER ON METALS

With workable methods for penetrating the sound barrier, metallurgists are concerned with new problems raised by heat. Air friction ups skin temperatures at high speeds



Rocket powered models are used to study aerodynamic heating of metals in supersonic range. Problem is already serious with missiles and only slightly less so for tomorrow's planes

By DR. ALLEN G. GRAY
Technical Editor

SPEEDS GO up and so do temperatures.

Problems of the metallurgist multiply as they are faced with the effects of aerodynamic heating on the strength of metals for aircraft now on the drawing board. Metals used must retain their strength in face of floods of heat generated by motion of aircraft through air. Aluminum gets so hot at sea level speeds of 1000 mph that it is not used for the fastest planes.

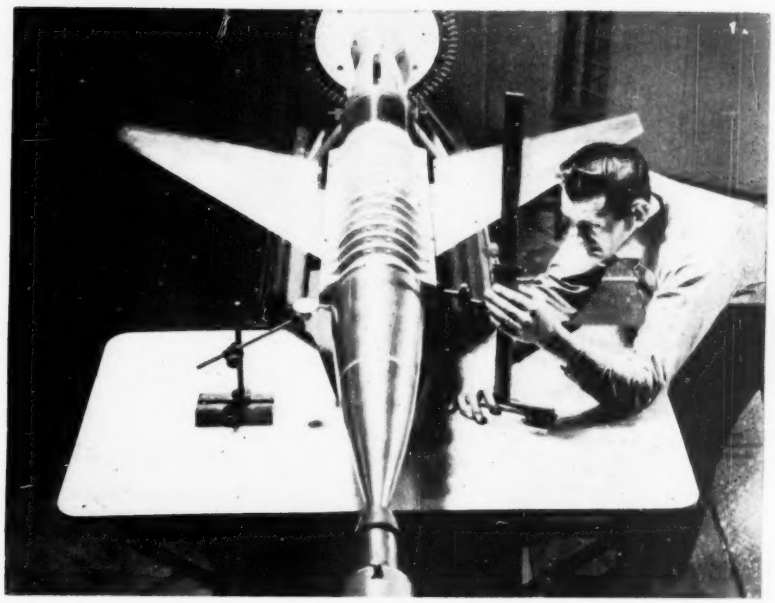
Sonic Heat—With missiles being flown at Mach numbers of 4 or higher, (Mach 1 equals the speed of sound at sea level) and with airplane speeds being projected farther into the supersonic range, temperature effects pose a serious problem in material selection. At sustained flight at Mach 4 at 40,000 feet the skin temperature of a missile can rise to 900° F.

Surface temperature of a jet plane traveling at 1400 mph may rise as high as the 450° to 600° F range. The Douglas X-3 now being designed for sustained supersonic flight for the USAF is intended to reach a speed of Mach 2, about 1320 mph. Large sections of the X-3 skin are to be made of titanium, especially parts that get heat from the engines as well as from aerodynamic heating. As airplanes go faster the areas of titanium used will expand. Eventually it can be seen that parts which are now planned for titanium will require even a better heat resistant material.

Strength Counts—Most obvious effect of aerodynamic heating is reduction in basic strength of metals used. Aluminum alloys lose much of their strength above 300° F. Selection of metals that will remain strong and at the same time give a structure with minimum weight becomes a primary consideration. Our defense department has a saying that goes like this: When one pound of weight is added to a plane 10 pounds must be added to the structure at a cost of $400.

This in itself is serious enough, but there are other problems which are even more complex. One such problem stems from the fact that at elevated temperatures, metals tend to creep; that is, under the action of an unchanging load, the material stretches. Useful life of an airplane may be limited by excessive distortion of the wings after continued flight at high temperatures. Depending on the temperature and load, the creep lifetime of a structure can vary between thousands of hours and a few seconds.

More Trouble—An entirely different structural effect of aerodynamic heating occurs when an aircraft or missile structure is subjected to rapid heating and portions of the structure undergo rapid changes in temperature. What happens is that the temperature distributions in the structure become uneven, causing thermal stresses and buckling. This can change the effective stiffness of the metals in the structure and cause the ship to flutter. With



Pilotless aircraft, rocket powered, is checked for alignment and dimensional accuracy during assembly. Smooth fairing will be placed over fuselage before the model is flown. Information needed in the design of supersonic missiles and aircraft will be sent to ground stations by telemetering devices

stiffness lowered by aerodynamic heating, an airplane which otherwise was flutter-free might suddenly develop flutter and be destroyed.

To study the rates and manner in which heat flows into the skin of missiles and aircraft structures at various speeds, new research techniques are used to give precise reproduction, on the ground, of that which takes place at speeds up to Mach number of 4. Other investigations are being made on heating up to Mach numbers of 10 or 6600 mph at altitude. If such speeds are maintained the temperature rise in materials comprising the structures will approach 7000°F.

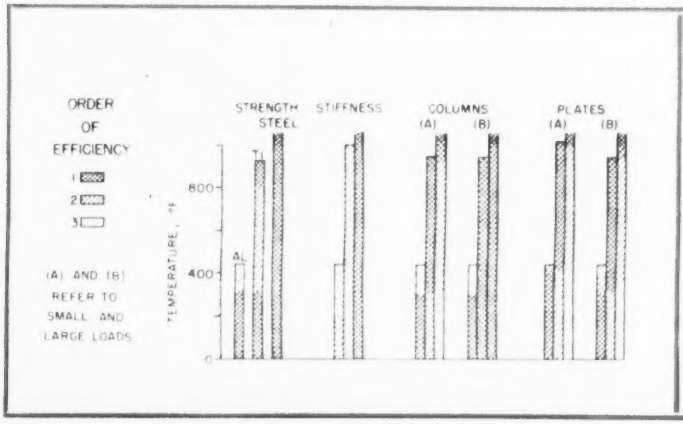
Two Directions—Rocket powered models equipped with telemetering devices to send required information back to ground stations are now being used by the NACA to study effects of the supersonic speeds on metals. Research is also going on at the laboratory scale to determine structural efficiencies of many metals at elevated temperatures.

Efficient temperature ranges have been studied in NACA's Langley Field laboratories for two high-strength aluminum alloys, two titanium alloys and three steels for short time compression loading applications at elevated temperatures. Some of the materials included in the evaluation are relatively new: Titanium alloys RC-130A and RC-130B, aluminum alloy XA78S-T6, and stainless steel W. These were tested along with the more conventional materials, extruded 75S-T6 aluminum alloy, steel SAE 4340, and the heat resistant nickel base alloy Inconel X (Table, p. 74).

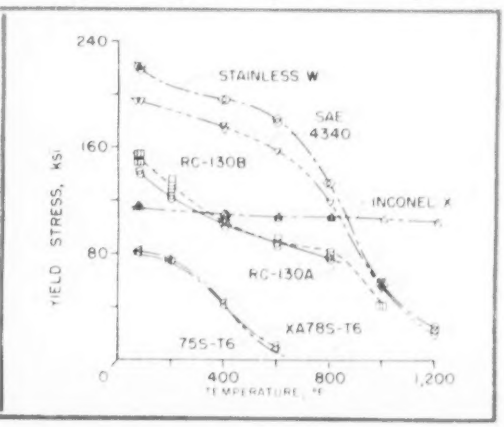
Structural—Compressive stress-strain tests are the basis of structural-efficiency comparisons for compressive loading. In these tests, NACA researchers kept the material at test temperature approximately one half hour before the load was slowly applied. The strain rate was maintained at about 0.002 inch per minute during loading. Autographic stress-strain curves were obtained. The compressive test results for Young's modulus and the yield stress (0.2 per cent offset) are given in table, along with other information on materials used in the evaluation.

Young's moduli for the materials varied from about 10×10^6 psi for the aluminum alloys to about 17×10^6 psi for the titanium alloys and to about 30×10^6 psi for the steels. The moduli for all the materials reduce with increase in temperature. The results for the new aluminum alloy XA78S-T6 are essentially the same as for extruded 75S-T6 aluminum alloy. Inconel X shows the

Efficiency of materials for strength, stiffness, and column and plate buckling



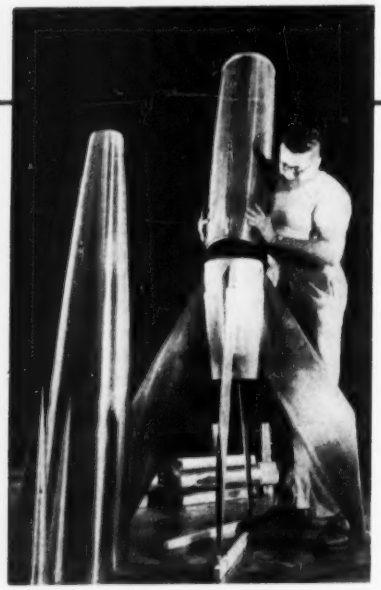
Compressive yield vs. temperature



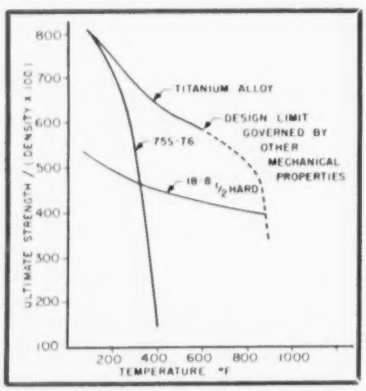
ALLOYS STUDIED BY NACA TO DETERMINE STRUCTURAL EFFICIENCIES AT ELEVATED TEMPERATURES

Material	Designation	Source	Additional heat treatment	Compressive properties and density at normal temperatures			
				Received Condition	Young's modulus, E, psi	Compressive yield stress, ksi	Density, lb/cu in.
Aluminum alloy extrusion	75S-T6	Aluminum Co. of America	None	Heat treated by manufacturer	10.5×10^6	78.5	0.101
Aluminum alloy sheet (0.25 inch thick)	XA78S-T6	Aluminum Co. of America	None	Heat treated by manufacturer	10.5	81.5	0.101
Titanium alloy sheet (0.064 inch thick)	RC-130A	Rem-Cru Titanium Inc.	None	Cold rolled and annealed	16.2	140.8	0.17
Titanium alloy forging	RC-130B	Rem-Cru Titanium Inc.	Heated to 1050° F for ½ hour to remove machining effects	Annealed	17.7	152.5	0.17
Steel sheet (0.064 inch thick)	Stainless W	U. S. Steel Corp.	Precipitation hardening. Heated at 1000° F for ½ hour	Solution annealed	30.2	220.0	0.28
Heat-resistant nickel-base alloy sheet (0.064 inch thick)	Inconel X	U. S. Steel Corp.	Aged at 1300° F for 20 hours and air cooled	Annealed	32.9	115.0	0.30
Steel sheet (0.064 inch thick)	SAE 4340	Crucible Steel Co.	Heated at 1525° F for 10 minutes in controlled atmosphere; air cooled; drawn at 800° F for 1 hour	Annealed	30.3	194.0	0.283

Work conducted by George J. Heimerl and Phillip J. Hughes, Langely Aeronautical Laboratory, NACA.



High flying speed makes dimensional accuracy, alignment and smoothness important factors for flying models



North American Aviation Inc.

Comparative strengths for equal weights of titanium alloy, 75S-T6 aluminum and 18-8 stainless steel. Strength-weight versus temperature

least effect of temperature.

Yield Stress — Evaluation of compressive yield stress with temperature gave a strength range from about 80 ksi for the aluminum alloys to about 220 ksi for the steels when tested at normal temperatures.

With the exception of Inconel X, there was a marked decrease in strength with increase in temperature. The aluminum alloys, the titanium alloys, and two of the steels lost about one half of their normal strength at approximately 400°F, 800°F, and 850°F respectively. Inconel X shows negligible effect of temperature over the range covered. Results for the two aluminum alloys are about the same (see curves). Similarly, there is little difference between the titanium sheet and forging alloys.

Strength Efficiency — Stress-density ratio, which is equivalent to the load-weight ratio for a unit length of structural member, measures the efficiency of a material. The higher this ratio, the more efficient the material on a strength-weight basis. With the exception of Inconel X, all the materials included in the study are about equally efficient at normal temperatures. The steels and titanium alloys retain this efficiency much better than the aluminum alloys as the temperature increases. Stainless W and SAE 4340 are somewhat more efficient than the titanium alloys RC-130A and RC-130B from about 300° F to 800°F. Inconel X is the most efficient material above about 950°F.

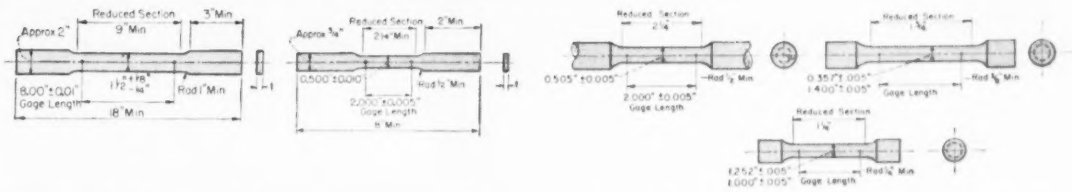
Buckling—For column buckling and the buckling of long plates in compression or in shear, the structural efficiency for a material at a given temperature is found by plotting calculated values of the buckling stress-density ratio against corresponding values of an appropriate structural index. With the exception of Inconel X all the materials have about the same order of efficiency up to 300°F. From there, up to 800°F, the titanium alloys, RC-130A and RC-130B, and the steels, SAE 4340 and stainless W, have about the same efficiency.

For plate buckling, the advantages of the light weight materials showed up. The aluminum alloys are most efficient up to about 450°F and the titanium alloys from there to about 1000° F.

Without considering the creep aspects, general indications are that the aluminum alloys are satisfactory for compression-loading applications for temperatures up to about 300°F. From about 300°F to 900°F, the titanium alloys look promising. At still higher temperatures, a good heat resistant alloy is needed to provide a structure having adequate strength and minimum weight.

Mechanical Testing Is Standardized

ASTM TENSION TEST FOR WROUGHT STEEL PRODUCTS



Sizes and tolerances of the standard rectangular tension specimens. For 8-inch specimens, reduced section shall be parallel within 0.010 inch; tolerance for 2-inch specimen is set at 0.005 inch

Two inches is standard for round test specimen; smaller specimens cre in proportion. To make easier computation, gage lengths in tests of rounds should be about four times coupon dicmeter

Preliminary Considerations

Specimens: Test coupons shall be selected in accordance with applicable product specifications.

Wrought steels: Usually tested in longitudinal direction.

Forged steels: Specimens normally taken from mid-radius.

Condition of specimen: As-rolled, as-forged, normalized, annealed, quenched and tempered, cold-drawn, cold-rolled or stress-relieved. Subject to product specifications and product limitations, conditions may be in combination.

Preparation: Specimens shall be sheared, blanked, sawed, trepanned or oxygen-cut from portions of material. Gage marks shall be light, sharp and accurately spaced. They shall be made with center punch, scribe marks or multiple device.

Aging: At room temperature 24 to 48 hours or for shorter time at moderately elevated temperatures by boiling in water, heating in oil or in oven.

Measurement: Rectangular shapes —To determine cross-sectional area center width dimension shall be measured to nearest 0.005 inch for 8-inch gage length and 0.001 inch for 2-inch gage length. Center thickness shall be to nearest 0.001 inch for both.

Round shapes: To determine cross-sectional area, diameter shall be measured at center of gage length to nearest 0.001 inch.

Testing apparatus: Two types are specified: Loading systems, either mechanical (screw power) or hydraulic; weighing systems, either lever and poise or dial.

Loading or weighing systems shall be used in proper loading range and calibrated periodically in accordance with latest revision of "Tentative Methods of Verification of Testing Machines," ASTM Designation: E4.

Loading: Load shall be transmitted axially. Gripping shall be restricted to section outside gage length. Exception is where sections are tested full size.

Speed: Shall not be greater than speed at which load and strain readings can be made accurately.

Test Procedures

Definition: Test is a method for determining modulus of elasticity, tensile strength, yield point, yield strength, proof stress, elastic limit, proportional limit, elongation and reduction in area.

Yield point: Determine by drop of the beam, halt in the gage or autographic diagram methods. If neither is applicable, use divider or total extension under load methods. Latter method, using an extensometer reading to 0.001 inch per inch of gage length, is not valid unless limiting total extension is increased for values above 80,000 psi.

Yield strength: Determine by offset or total extension under load methods. Offset, use extensometer reading to 0.0001 inch per inch of gage length. Report as: Yield strength (offset = per cent) = x psi. Extension under load method requires an extensometer reading to 0.0001 inch per inch of gage length or stress-strain diagram may be used. Report in either case as: Yield strength (extension = x per cent) = x psi.

Proof stress: Determine by release of load or offset method.

Elongation: Distance between gage marks shall be measured to nearest 0.01 inch for gage lengths 2 inches and under and to nearest 0.5 per cent for gage lengths over 2 inches. It is permissible to use a percentage gage or scale to obtain per cent of elongation directly, but readings shall be made to nearest 0.5 per cent. In reporting elongation values, give both percentage increase and original gage length.

Reduction of Area: Mean diameter or width and thickness at the smallest cross section shall be measured to same degree of accuracy as the original dimensions.*

*Bend Test and Impact Test tables are on next page.

FOR the first time, all engineers who test products, as well as busy executives who peruse technical reports, can meet on common ground. American Society for Testing Materials recently adopted standard mechanical test methods and definitions for steel products.

Subjects covered include wrought, cast, bar and tubular steel products. To achieve uniformity where several test methods are applicable, specific tests are advocated. Details, such as preparation of test specimens and operation of test apparatus, also are set out. In some instances, standards are taken from existing ASTM regulations, such as procedure for calibrating and adjusting impact machines.

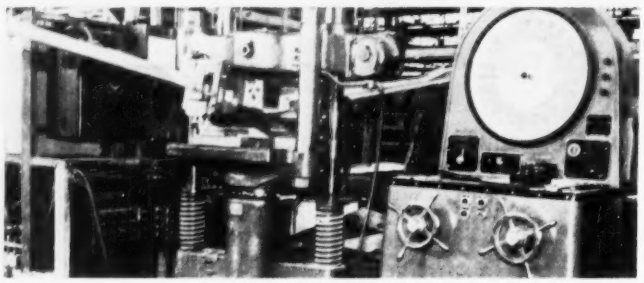
This abstracted version of the Society's "Tentative Methods and Definitions for Mechanical Testing of Steel Products" is confined to tension, bend, hardness and impact testing of wrought steel products.

Checklist—As a preface to its 27-page paper, ASTM summarizes four general precautions to follow in mechanical testing.

Here they are: 1. Fabricating techniques, such as bending, forming or welding, may affect properties of materials under test. Properties shown by testing before fabrication may not be representative of the completely fabricated prod-

Continued on p. 91

ASTM BEND TEST FOR WROUGHT STEEL PRODUCTS



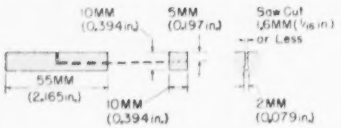
Definition: This is a method for evaluating ductility, but it cannot be considered as a quantitative means of predicting service performance in bending operations.

Procedure: Bend specimen at room temperature to an inside diameter to extent specified without major cracking on outside of bent portion.

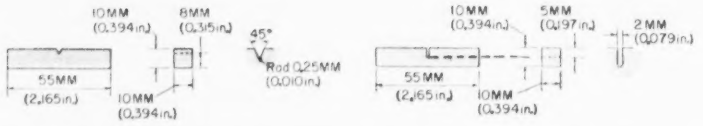
Speed: Ordinarily not an important factor.

Aging: Standard same as in tension testing.

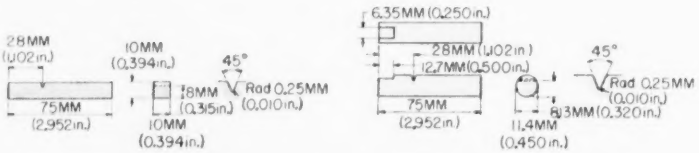
ASTM IMPACT TESTS FOR WROUGHT STEEL PRODUCTS



Charpy keyhole test specimen. Permissible variations: Cross-section, 0.001 inch; depth under notch, 0.001 inch; length, 0.010 inch



Charpy V-notch (left) and U-notch specimens. In former, angle of notch may vary 1 degree. Other tolerances for both; Cross-section, depth under notch 0.001 inch; over-all length, 0.010 inch



Izod V-notch square specimen, left. V-notch round-type specimen, right. Tolerances are same as Charpy test, including notch angle

Definition: This is a dynamic test.

Tests: Charpy and Izod tests are recommended.

Calibration: For calibration and adjustment of Charpy and Izod machines, refer to sections 17 and 28 of "Tentative Methods of Impact Testing of Metallic Materials," ASTM Designation: E 23, or corresponding sections in later revisions.

Specimens: Unless specified otherwise, following procedure shall apply to both tests:

A. Longitudinal specimens shall be used.

B. Each test shall consist of the average value of 3 specimens. Not more than one value shall be below the specified minimum and in no case two-thirds below it. If more than one value does not meet either requirement, retest of three additional specimens shall be made. Each must have a value equal to or greater than the specified minimum.

Charpy specimens: Keyhole notch shall be used, unless specifications permit use of U-notch or V-notch. Standard 10 by 10 mm keyhole notch specimen shall be used where thickness is ½ inch or greater. Below this thickness, specimens shall be machined to following dimensions: 10 mm by 7.5 mm, 10 mm by 5 mm and 10 mm by 2.5 mm.

Izod specimens: V-notch specimens, square or round, shall be used.

Preparation: Following rules shall apply to Charpy and Izod specimens:

A. Base of notch shall be perpendicular to surface of specimen.

B. Keyhole notches shall be made by drilling round hole. Slot shall be cut by any feasible means.

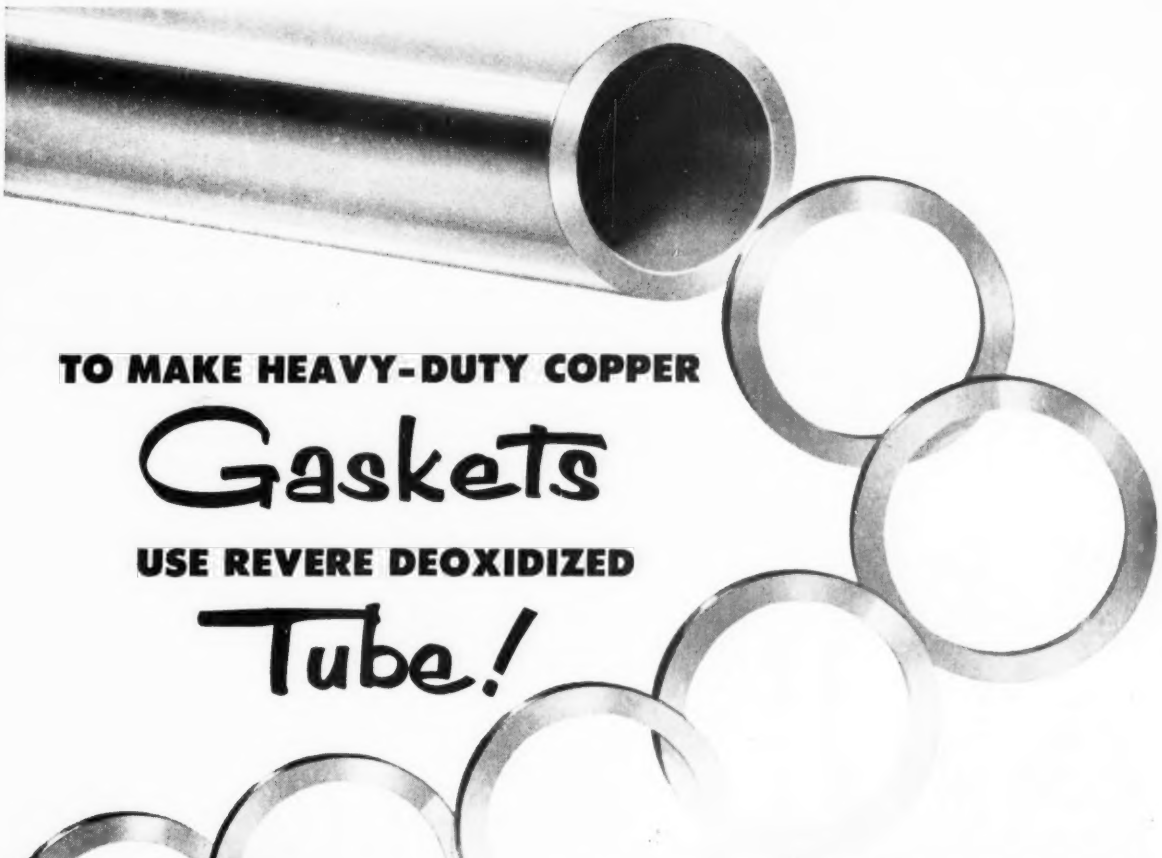
C. U-notches shall be made as above, except width of slot shall be equal to diameter of hole. V-notches and U-notches for both Charpy and Izod tests also may be made in one operation by formed milling cutter or grinding wheel.

Aging: Standard prescribed for other tests shall be followed.

Temperature: Temperature at which test is conducted shall be recorded. When low temperatures are specified, test bars shall be held at named reading for at least 15 minutes or until temperature throughout specimen is equalized. Test shall be made within 5 seconds after specimen is removed from cooling device.

Charpy: All specimens shall be tested in a Charpy pendulum-type testing machine.

Izod: All specimens shall be tested in an Izod pendulum-type testing machine.



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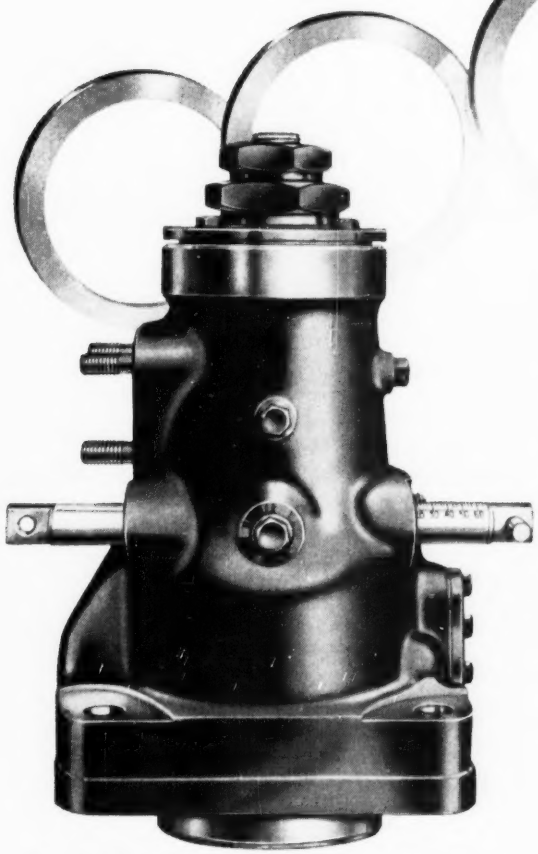

Diesel Fuel Injection Pump, made by American Bosch Corp., Springfield, Mass., and gaskets made by cutting rings off 2" deoxidized copper tube.

• An important extra service rendered by Revere consists of collaboration in setting up specifications. This is valuable because there are many different Revere Metals, each with special characteristics. No one copper, for example, will serve to best advantage in every application. A case in point is the matter of copper gaskets for Diesel fuel injection pumps. Copper is of course an ideal metal for gaskets, and is widely used for that purpose. But for this special application, which copper and in what form? The pump is used on large engines for municipal generating plants. It weighs 186 pounds, and must produce the high pressure required to inject fuel near the top of the Diesel compression stroke. Naturally, the load is a pulsating one. American Bosch Corporation came to Revere with the problem. Our suggestion was that much scrap could be saved if the gaskets were made by cutting rings off copper tube, instead of stamping them from strip. This achieved a double purpose, since the tube is made of deoxidized copper, which is superior in this application to electrolytic. We are able to report that these recommendations proved successful. . . . This work was done by the Revere Technical Advisory Service. To get in touch with it, see the nearest Revere Sales Office.

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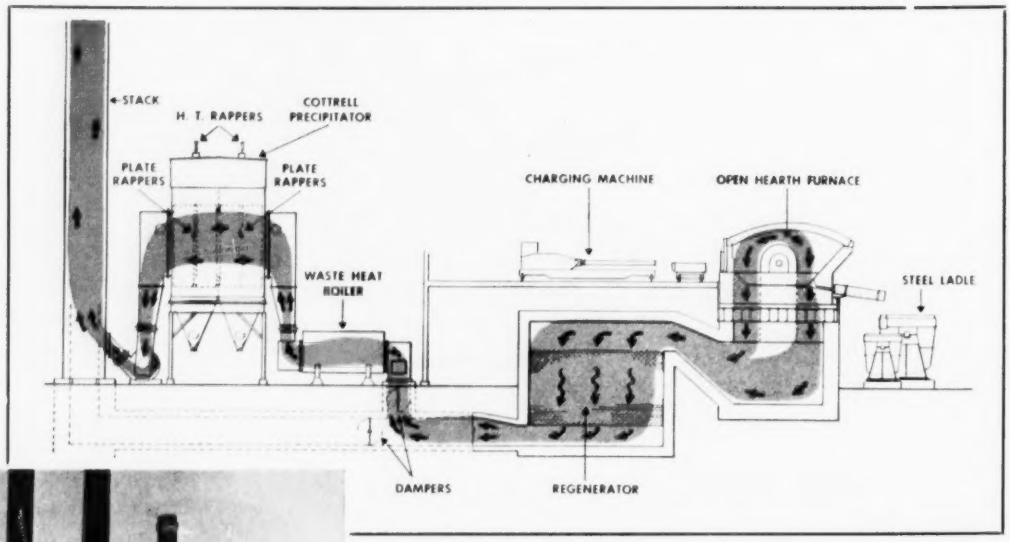
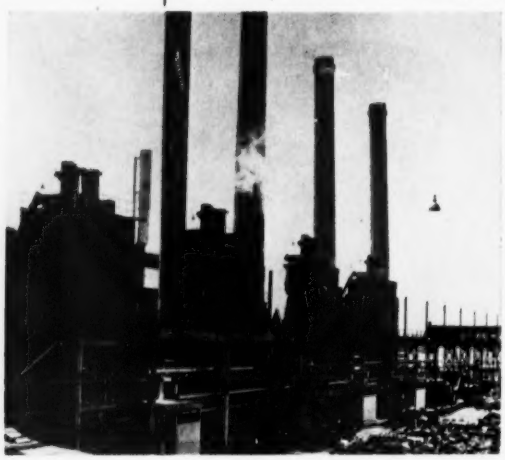




Box-like structures alongside four open hearth stacks at Columbia-Geneva Steel, Torrance, Calif., are 60-foot-high precipitators controlling air pollution. Diagram shows gas flow cycle from origin in the open hearth to discharge after cleaning

Precipitators Pass Smoke Control Tests

Dust discharge drops after application of electrostatic precipitators for open-hearth gas cleaning. Opacity and recovery efficiency beat pollution standards

RESULTS exceeded equipment makers' guarantees when the Torrance Works of U. S. Steel Corp.'s Columbia-Geneva Steel Division applied electrostatic precipitators for open-hearth gas cleaning. Precipitators' performance in controlling smoke emissions to prevent air pollution was well above control requirements set by Los Angeles county, where tests were made.

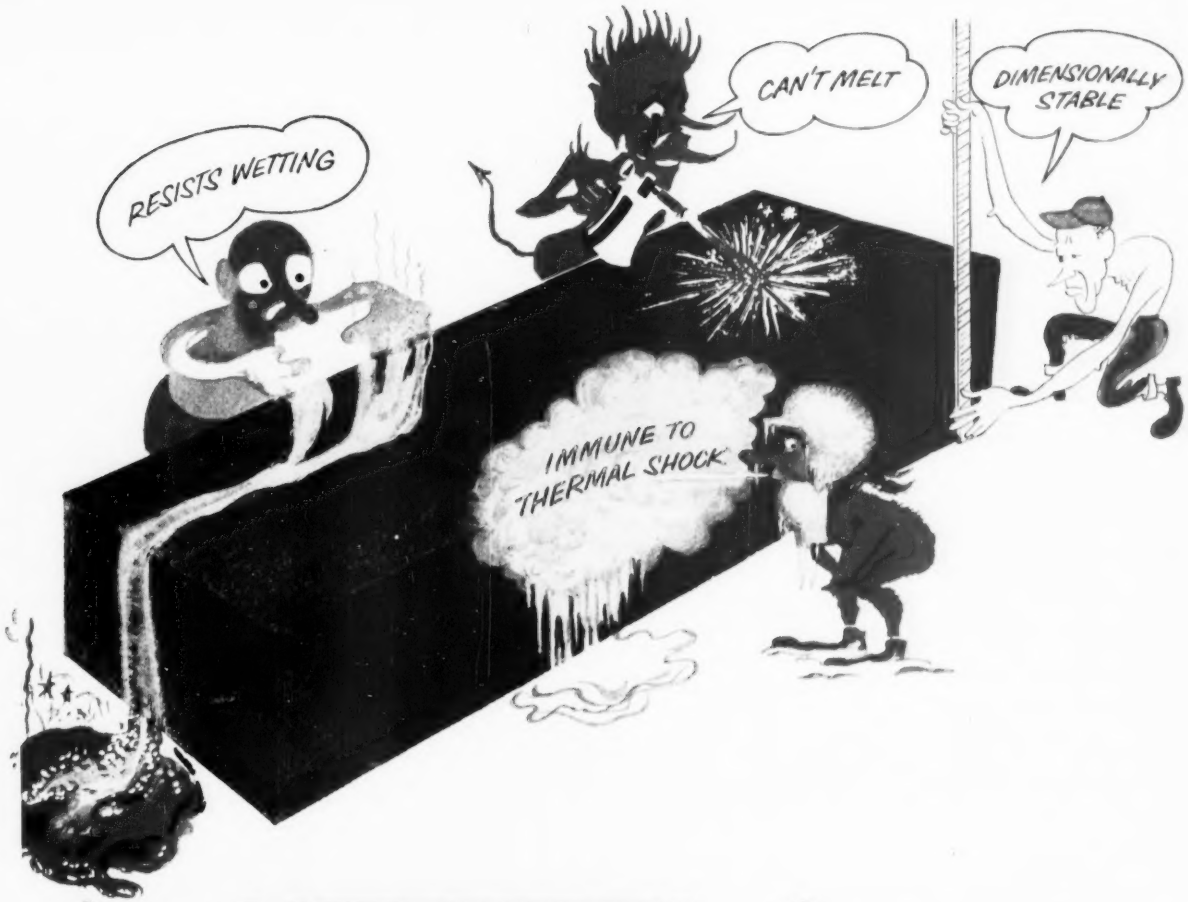
Stack dust discharges averaging 75 pounds and reaching 245 pounds per hour from open hearth furnaces were reduced by the precipitators to an hourly average of 2.02 pounds. Stack emissions are virtually invisible after electrostatic cleaning of furnace exit gases.

Producers — Precipitators were designed and manufactured at Torrance in 1950 for first investigative runs of this equipment under commercial open-hearth steelmaking conditions. Results were so satisfactory that three more units were later installed, completing installation of gas cleaning equipment for four open-hearth furnaces, each of 58-ton capacity.

Previous efforts of open-hearth operators to control furnace gas emissions were unsuccessful. With its precipitator installation, the Torrance Works became the first open-hearth steel shop to use precipitators and one of the first to be equipped with a complete gas cleaning installation of any type.

Minute Particles—Open hearths at Torrance are fired by oil or a combination of natural gas and oil. Particle sizes of the dust from open hearths is smaller when oil-fired than when gas-fired. Over half the dust carried in the gases given off by the open-hearth process is in the 0.15 to 1.0-micron size range, with none of it larger than three microns. Smallest particles visible to the naked eye are about ten microns, indicating the high dust-collecting efficiency required in cleaning these gases.

Each furnace produces 58 tons of steel ingots in an eight to ten-hour operating cycle. Each furnace melts down 136,000 pounds of processing material to produce this tonnage. Cold metal—pig iron,



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13½" x 6" x 3" series
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☆

Write for Catalog Section S-6210

If you think of carbon only in terms of complete furnace linings, check these other important locations in and around the furnace where "National" carbon brick and shapes will also save time and money as a maintenance refractory:

- ✓ ***RUNOUT TROUGHS***
- ✓ ***CINDER NOTCH LINERS***
- ✓ ***CINDER NOTCH PLUGS***
- ✓ ***SPLASH PLATES***
- ✓ ***SKIMMER PLATES***

. . . and Many More!

The term "National" is a registered trade-mark of Union Carbide and Carbon Corporation

NATIONAL CARBON COMPANY

A Division of Union Carbide and Carbon Corporation, *30 East 42nd Street, New York 17, N. Y.*

District Sales Offices: Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco

In Canada: National Carbon Limited, Montreal, Toronto, Winnipeg

COMPARISON OF CONTROL LIMITS WITH PRECIPITATOR PERFORMANCE

	Los Angeles County Control Limits	Guaranteed Performance	Performance During 30 Separate Tests
Stack discharge of dust in lbs. per hour	14.3	11.5	Minimum 0.33 Maximum 7.62 Average 2.02
Opacity	Less than #2 shade on Ringlemann chart	—	Stack emissions practically invisible at all times
Recovery efficiency	Approx. 90%	95.9%	Minimum 96.0 Maximum 99.9 Average 98.1

steel and steel scrap—makes up 129,000 pounds of total process weight. Limestone comprises 5600 pounds and coke, 1500 pounds.

Precipitators Succeed—Exit gas volume from each furnace is approximately 15,000 cfm at standard conditions. Gas temperatures range from 1300° to 1550° F. Dust concentrations in the gases average 0.7 grains per standard cubic foot, with maximum concentrations being two grains per standard cubic foot.

Under these conditions, volume of dust discharged to the air by each furnace stack, before installation of the precipitators, averaged 75 pounds per hour, with a maximum of 245 pounds per hour. Opacity during part of the heat cycle was 40 per cent darker than the #2 shade on the Ringlemann chart, which is used in determining visual smoke density.

Requirements — Los Angeles county smoke-control ordinances limit the amount of dust allowable from each stack to 14.3 pounds per hour. Opacity of stack emissions was limited to less than #2 shade on the Ringlemann chart. Guaranty provisions of the precipitator installation proposed to deliver a minimum gas cleaning efficiency of 95.9 per cent, reduce effluence of each stack to 11.5 pounds per hour and reduce opacity of emissions to less than the #2 shade.

Results exceeded guaranteed performance in each case. Precipitator results in 30 separate tests averaged stack discharge of 2.02 pounds of dust each hour. Emissions were nearly invisible and recovery efficiency averaged 98.1 per cent.

Practical Engineering—A noteworthy example of practical engineering solved the problem of reducing temperatures of furnace gases to the range required for effective electrostatic cleaning. Furnace exit gases of 1300° to 1500° F were cooled to 550° F at the precipitator inlet flue by passing gases through a waste-heat boiler. Surplus Btu's were put to work providing process and heating steam for the rest of the plant.

Cottrell precipitators designed by Research Corp., New York, for this application are of the dry-plate, horizontal flow type. Each has two gas cleaning sections connected in series. Incoming gas flows through a duct arrangement in the sections made up of successive banks of dust collector plate electrodes. Filamentary high-tension discharge electrodes are suspended in the centers of these ducts, held taut by weights at the bottom of the electrodes.

Electric Charge—Discharge electrodes receive a charge of 47 to 67 kv's which sets up a strong electrical field between the two sets of electrode banks in the ducts. Suspended solids carried in gases flowing through the ducts are ionized for attraction by the grounded collecting electrodes. Dust hoppers at the bottom of each precipitator section receive the collected material for disposal.

Electrode rapping equipment developed by Research Corp. provides an automatic method of removing dust from the collecting electrode plates.

In operation of the precipitator, some of the collected material normally accumulates on the collecting plates, instead of falling into the disposal hoppers. Precipitator maintenance consists chiefly of unloading these accumulations by intermittent rapping of the plates. Accumulations unloaded by intermittent rapping are heavy enough to cause clouding disturbances in the precipitator, which at stack discharge level are known as "rapping puffs."

Eliminates Nuisance — New rapping equipment automatically prevents excessive accumulations and the "rapping puff" nuisance. Electro-magnetic rappers keep the collecting plates under constant vibration to prevent excessive accumulations. (STEEL, Mar. 9, 1953, p. 123).

This continuous electrode cleaning service, designated as the magnetic-impulse (MI) continuous rapping system, requires a minimum of supervision. A remote control unit permits monitoring the entire system from a convenient plant location. Other benefits expected from this automatic maintenance service are improved precipitator efficiency and lower operating costs.

Self-Cleaning Collector

Development of its type CH-3 self-cleaning cloth screen dust collector is reported by Pangborn Corp., Hagerstown, Md. The unit permits continuous automatic dust collection, constant air volume and suction, and positive reverse flow filter cleaning.

The collector employs the principle of reverse air flow for continuous cleaning of its cloth filters. This is accomplished by action of a traveling manifold whose integral reverse air blowers take air directly from the collector's clean air side.

The manifold covers three vertical rows of cloth-covered screen frames at one time. Reverse flow of air is blown through the center row of screens while normal air flow through center row of screens is knocked off.

This arrangement causes dust to be blown from all external surfaces of filter elements, allowing it to drop into the hopper instead of being entrained. Standard sizes are made with six-screen-high construction.

Remember it's

Jalten*

for

- HIGH STRENGTH
- GOOD FORMABILITY
- RESISTANCE TO CORROSION
- RESISTANCE TO ABRASION

You'll find the data you want in this book . . . send for your copy TODAY! Features of this book show how JALTEN can help you build better products:

- **Chemical Properties of Jalten**
- **Mechanical Properties of Jalten**
- **Jalten Equivalents**
- **Jalten Application Data**

J&L's new JALTEN series replaces the famous Otiscoloy line and may be selected in the following combinations of advantages:

Jalten No. 1—High strength, good formability and fabricating, good low temperature.

Jalten No. 2—High strength, impact resistance, moderate forming—improved resistance to atmospheric corrosion.

Jalten No. 3—High strength, moderate forming—improved resistance to abrasion.

J&L STEEL

Jones & Laughlin Steel Corporation
404 Liberty Avenue, Gateway Center, Pittsburgh 30, Pa.
Please send me a copy of "Jalten . . . the low alloy high strength steel."

Name_____

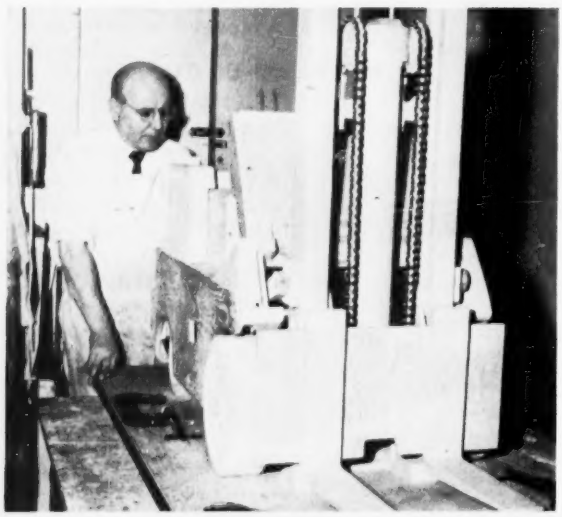
Company_____

Address_____

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH

Preliminary design—October, 1951

Design selection—November, 1951



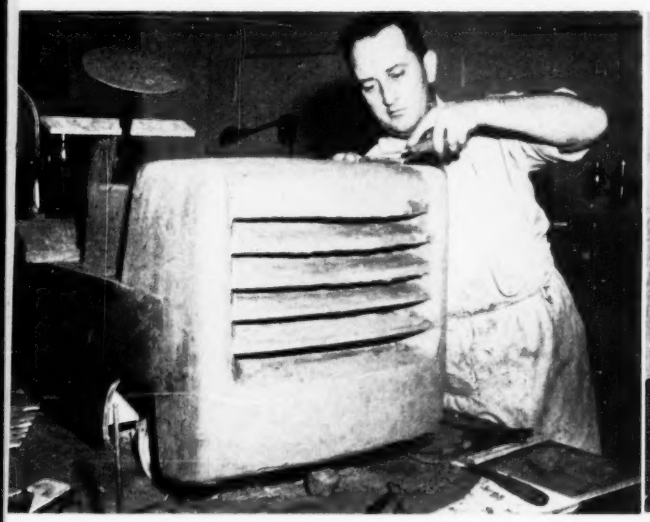
Half-size wood model—March, 1952

Lines Point to Truck Progress

There's more to the redesigned handling workhorse than a glossy coat. Experimental evolution will mean improved production models

Start of metal sample—April, 1952

Metal cowl working sample—June, 1952



Half-size clay mock-up—December, 1951

Painted clay model—February, 1952

FUTURISTIC or experimental models, once almost the exclusive customer-reaction gage and publicity device of the auto industry, are becoming a valuable tool in the materials handling field. Lift truck manufacturers, whose product rarely has assumed more than a cow-like grace, are discovering the value of svelte lines, smooth operation and advanced accessories.

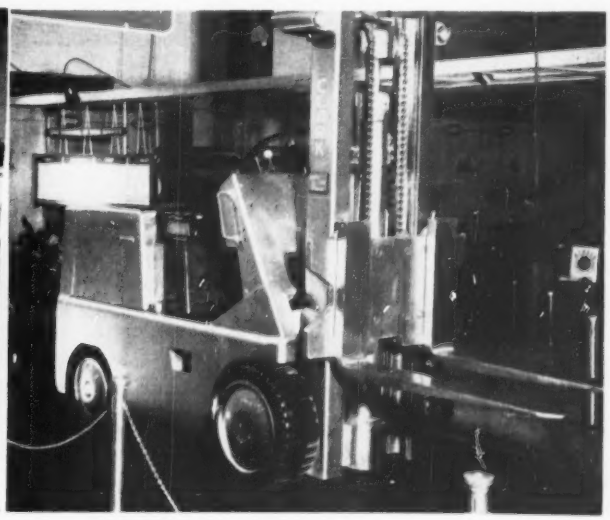
At last spring's handling show, one firm imported a veteran auto body designer to finish off its new lift's lines. Another manufacturer, Clark Equipment Co., came up with the experimental X-70, shown here in development stages.

This model was the product of a year's collaboration between Harley Earl Co. designers and Clark's Industrial Truck Division engineers. As the photos indicate, it was "created" through the entire gamut of evolution stages: Preliminary design and selection, scale clay and wood mock-ups, metal samples. Some of its features: A lighter frame, adjustable automotive-type seat, automatic drive, built-in two-way radio, counterbalanced hood.

While the streamlined body offers considerable eye-appeal, it also serves a functional purpose. For instance, frame sides between front and rear wheels are turned under and form an oil reservoir on one side of the truck, a fuel tank on the other. Clark engineers say this makes for a lighter, sturdier frame that also provides good accessibility to the engine compartment. The counterweight is not just streamlined; it's fastened to the frame for removal without a hoist.

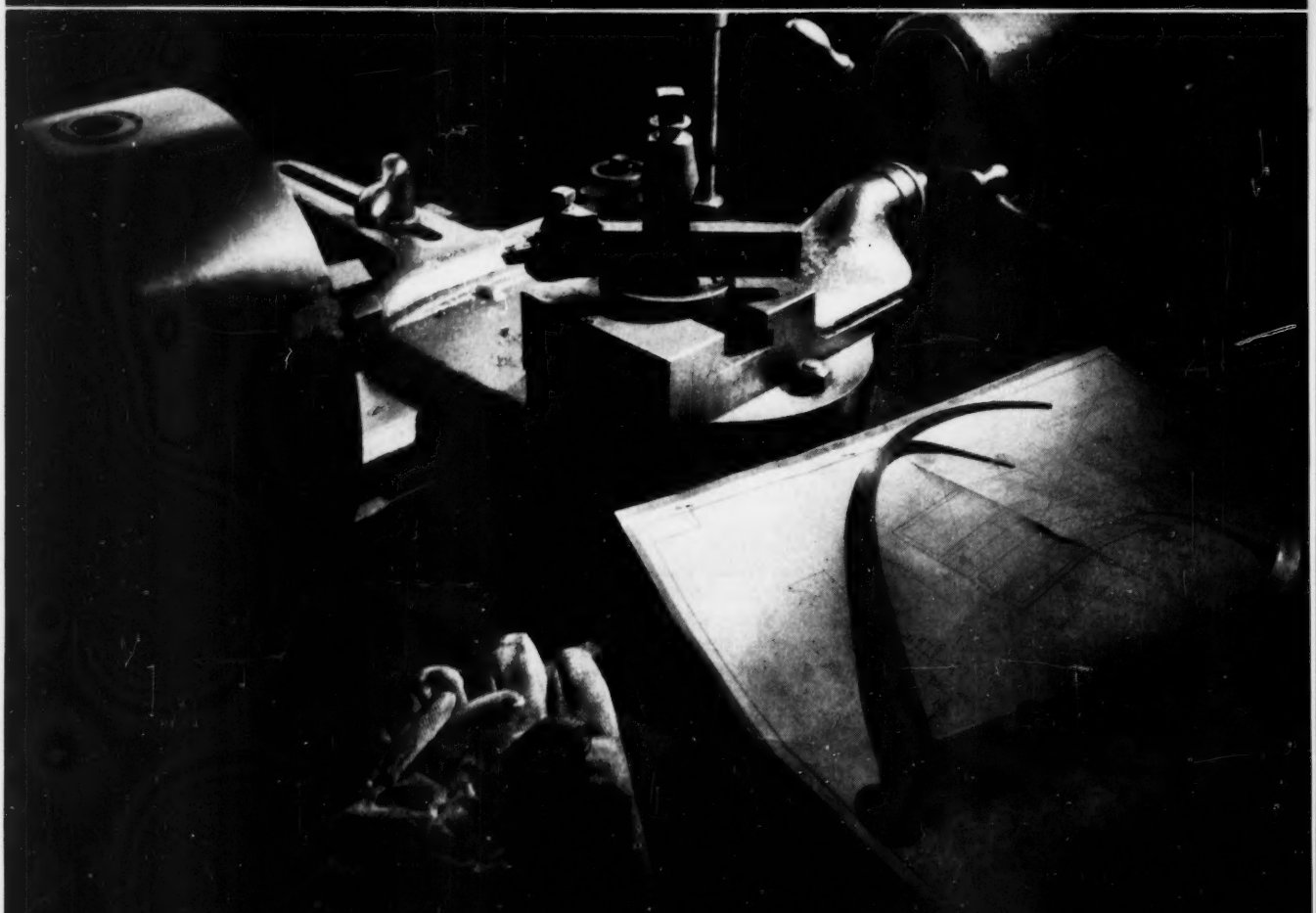
Like the automotive Le Sabre, Clark's "Fork Truck of the Future" will probably never appear as a production line model. But the firm will incorporate many of its mechanical innovations into line units after digesting results of questionnaires circulated at the handling show.

Original version—November, 1952



Polished model—May, 1953

WHY IT PAYS TO BUY STEEL FROM WAREHOUSE



You don't lose production time waiting for steel!

WHEN YOU BUY STEEL FROM WAREHOUSE, YOU GET:

- LOWER INVENTORY COSTS
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- LOWER TIME COSTS
- LOWER CAPITAL INVESTMENT
- FASTER PRODUCTION
- FEWER INVENTORY LOSSES

You don't have to adjust your production schedule to match mill rollings when you use a U. S. Steel Supply warehouse as your own. We can make deliveries to suit *your* convenience. The stocks in our *local* warehouse and the resources of our 14 other warehouses promise delivery of the steel you need when, where and in the condition you want it. Contact your U. S. Steel Supply salesman.

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UNITED STATES STEEL

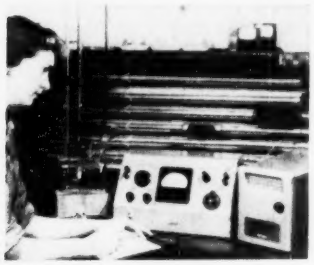
NEW PRODUCTS and equipment

Reply card on page 87 will bring you more information on any new products and equipment in this issue

Polarizer, Galvanometer

. . . analyze plating solutions

Chemical analysis of plating solutions can be completed with a high degree of accuracy and speed in this electro polarizer and a portable galvanometer Developed



by Patwin Instruments Co. and supplied by GE, the polarizer employs the polarographic method of analysis.

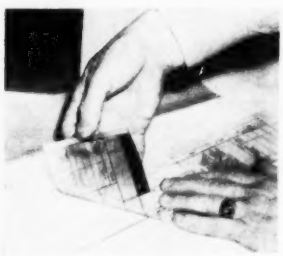
Manufacturer reports routine analysis of copper cyanide solutions that took an hour can be completed in 15 to 20 minutes. General Electric Co., Dept. ST, Schenectady 5 N. Y.

FOR MORE DATA—CIRCLE REPLY CARD NO. 1

Printed Plastic Sheets

. . . eliminate hand lettering

Transeal title blocks, bills of material, change blocks, technical



symbols, etc., eliminate rubber stamps and time-consuming hand lettering, symbol drawing and ruling usually required for engineering drawings. Product is a thin transparent printed plastic sheet with a pressure-sensitive adhesive coating that is protected by removable waxed paper.

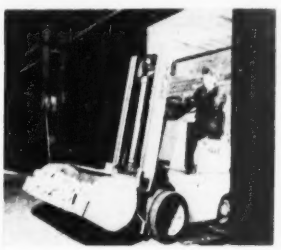
Unit is furnished for application to either reverse side or face of drawings. It is applied easily by slight hand pressure without use of heat. Johnson Research Corp., Dept. ST, Bethpage, Long Island, N. Y.

FOR MORE DATA—CIRCLE REPLY CARD NO. 2

Hydraulic Scoop Attachment

. . . any desired discharge rate

Controlled dumping at any desired discharge rate and at any elevation up to maximum lift height of the truck is gained by this hydraulic scoop attachment. Scoop can be attached or removed



quickly from any of the manufacturer's fork lifts and establishes a simple method for picking up, moving and dumping free-flowing bulk materials.

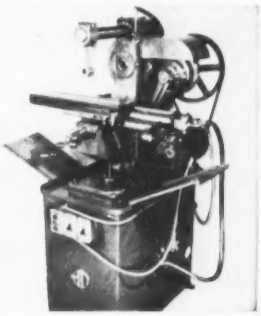
Actuated by double-acting cylinder and with truck uprights vertical, it provides a 38-degree dumping angle down from the horizontal; a 37-degree backward angle handles loads without spillage. Yale Materials Handling Division, Yale & Towne Mfg. Co., Dept. ST, Philadelphia 15, Pa.

FOR MORE DATA—CIRCLE REPLY CARD NO. 3

Semiautomatic Mill

. . . choice of three bores

This semiautomatic mill requiring investment comparable to many bench mills, achieves production rates by incorporating rapid approach, infinitely adjustable



cutting speeds and automatic return.

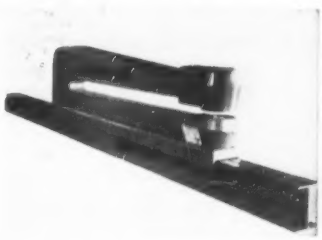
Large diameter spindle is supplied with choice of three bores: Nos. 9 and 10 B & S or No. 4 Morse taper. It has 15 spindle speeds. Rotex Punch Co., Dept. ST, 2350 Alvarado, San Leandro, Calif.

FOR MORE DATA—CIRCLE REPLY CARD NO. 4

Radiation Gage

. . . permits standardized systems

Basic mounting redesign for AccuRay radiation gages features



streamlined measuring head and tapered bracket. It permits a

The requirements for championship in golf are rigid:

- a genuine interest in the game
- ability to apply proved techniques
- practice-perfected skill
- proper equipment

The requisites are the same in our game. When you select an industrial contractor, you want a company which is keenly interested in doing an outstanding job—has a broad knowledge of the best techniques—is thoroughly experienced—employs the most modern equipment.

The CCC team is proud of its qualifications and accomplishments—of the long list of clients it has served not once, but many times.

Just as any good golfer welcomes the chance to compete, so this industrial team welcomes the opportunity to bid on any project involving one or more of the many CCC services.

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NEW PRODUCTS and equipment

standardization of measuring systems throughout the complete line of mountings.

Tapered bracket is available in throat depths to 160 inches. Of special interest where sheet profile control is important is a variable-speed scanning mechanism. The latter enables the gage to move slowly across sheet, presenting a continuous profile picture, then retract quickly to repeat the cycle. When gage withdraws, recorder pen remains stationary. Industrial Nucleonics Corp., Dept. ST, 1205 Chesapeake Ave., Columbus 12, O.

FOR MORE DATA—CIRCLE REPLY CARD NO. 5

Microfilm Camera

. . . films series of pages

Single pages or series of pages stapled together can now be microfilmed conveniently without removing and then replacing the

binder with this model No. 4 microfilm camera. The camera handles single sheets, even bound volumes with pages spread open, magazines, engineering notebooks and other bulky originals in all sizes up to 11 x 17 inches.

A visual supply indicator shows at a glance the amount of film left in the camera. An audible signal indicates improperly loaded film, when take-up reel is full or when

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69. Blast Cleaning

Pangborn Corp.—Small standard units for blast cleaning and dust collection are described and illustrated in new booklet. Various job requirements are analyzed, and the correct equipment indicated in both classifications.

70. Copper Oxide Batteries

National Carbon Co.—Catalog Section R-9500 describes copper oxide-caustic soda primary batteries for railroad signal, communications and slide protection service. A 1000 amp/hr cell is featured, with three zinc and two copper plates. Two others are also discussed, and complete operating characteristics given.

71. Wire Rope Slings

Macwhyte Co.—Atlas, Drew and Monarch type wire rope slings, sling fittings; safe-lock terminals; and crane ropes are illustrated with full specifications in 94-page catalog S-8. High-lighted are 10 pages of general information and 20 pages of photos which indicate the wide variety of applications.

72. Electric Tractor

Yale & Towne Mfg. Co., Philadelphia Div.—Features of the model MT Worksaver electric tractor, a heavy duty unit for industrial towing operations, are described and illustrated in 4-page booklet P-996. Full-load speed is 2 mph and wheelbase is 30 in.

73. Steel Bar Selection

Joseph T. Ryerson & Son, Inc.—4-page bulletin covers, in condensed form, the characteristics, mechanical properties and uses of a comprehensive list of hot rolled and cold finished carbon and alloy steel bars. It is designed to make comparison of the various types as quick and easy as possible.

74. Jet Blade Profiling

Ex-Cell-O Corp.—The use of jet blade profiling machines for precision milling, grinding and polishing the air-foil form of jet engine blades in automatic cycles is subject of 4-page illustrated bulletin No. 50620. Specifications are given on three companion machines which perform first, second and third operations.

75. Carbide Dies

General Electric Co., Carboloy Dept.—Including a new list of header die nibs and special data on wire flattening rolls, welding rod coating dies and capstan rings, 30-page catalog D-130 illustrates and describes a complete line of carbide dies. Tabular engineering aids are also given.

76. Industrial Pumps

Deming Co. — Rotary, oscillating force, vertical piston, centrifugal latex, two-stage centrifugal, vertical turbine, hydraulic pressure, deep well and triplex pumps are but a few of the types described in complete 96-page "Industrial Catalog I-52." In addition to giving complete application and performance data on pumps, this guide book lists full specifications of entire line.

77. Steam Throttle Valves

Vernon Tool Co., Brown Valve Div. —Bulletin BV-6 describes and illustrates a complete line of 3 and 4-in. throttle valves for steam service. Features are described, and a cutaway drawing illustrates construction features and parts.

78. Metals Cold Treatment

Bowser Technical Refrigeration—Containing specifications and construction data on new T series units for temperature ranges to —200° F or lower, bulletins on metals cold treatment units also feature data on specific applications of the process in product fabrication.

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79. Weldments & Assemblies

Continental Foundry & Machine Co. — Fabricated steel weldments, composite welded assemblies of fabricated steel plate and castings and cast-welds assembled entirely of castings are subject of 6-page illustrated bulletin. Physical advantages of weldments, design principles, economy factors and company facilities are detailed.

80. Large Industrial Motors

Wagner Electric Corp.—Welded steel frame and stator laminations welded together while compressed under hydraulic pressure are design features of Wagner large industrial Squirrel-cage motors, covered in 4-page illustrated "Wagner Industrial Product News" No. 9. Many other features are described.

81. Coupling Tapping Machines

Wm. K. Stamets Co.—Fully automatic high production pipe coupling tapping machines which tap to a tolerance within 0.001-in. are subject of bulletin 100-C of 4 pages. Couplings ranging from 2 to 13⅝ in. OD pipe size can be handled. Specs and operational data are included.

82. Plastic Rubber Coatings

Magic Chemical Co.—Easy-to-read outline type catalog contains details about Magic-Vule antiabrasion and anticorrosion plastic rubber coatings. Potential uses include repairing conveyor belts and protecting industrial equipment.

83. Control Panels

Bailey Meter Co.—Combustion and process control panels are subject of 8-page illustrated bulletin No. 170. Designs, methods of tubing and wiring and accessories are fully dealt with. Units can be designed and built to any specification.

84. Solving Design Problems

Drop Forging Association — Durable "Problem Parts Attack Chart" offers comprehensive information on the solution of design problems through use of closed die forgings. Major design factors are listed in order of their importance as indicated by recent survey of industrial designers.

85. Adhesives and Coatings

Minnesota Mining & Mfg. Co.—Industrial uses of 3M adhesives, coatings and sealers are shown in 8-page illustrated booklet. Technical information is given on 26 products. Typical examples are adhesives for holding plywood to metal, rubber to metal, and vinyl to wood; coatings for anticorrosion protection, smoothness and safety; and sealers for fuel tanks, windshields and other applications.

86. Mill Drive Regulator

Westinghouse Electric Corp. — A device for controlling mill drives, the Magamp is subject of 20-page illustrated bulletin B-5468. Typical applications include controlling tension on both hot and cold mill reels, controlling speed on rod and merchant mills, and controlling speed and tension on high-speed slitting lines. Installation photos are shown, together with typical circuit diagrams.

EDITORIAL ARTICLES

Available in Limited Quantities

87. Line Grinding

"Line Grinding Solves Cutting Problems" is a well-illustrated technical article which explains how precision work with a band machine permits the grinding of internal and external surfaces in a vertical position. Written by H. J. Chamberland, field engineer of DoALL Co., STEEL reprint also deals with removal of a die section that is damaged.

88. Weighing Electronically

The use of strain gages or load cells and electronic instruments is combined in electronic scales described in 4-page article by Harry Chandler, associate editor of STEEL. Applications to all types of industrial weighing are covered.

89. Visit to Rolling Mill

"Rolling Mill is Tale of Two Cities" is reprint of another of STEEL's articles in the Progress in Steelmaking series. The reader is taken on a written and pictorial tour of Pittsburgh Steel's Monessen works and the new hot strip mill at Allenport, Pa. Steel slabs are transported 5 miles down the Monongahela river between these plants.

90. Industrial Waste Disposal

An industrial waste treatment unit that handles up to 1 million gallons during a 10-hr working day was recently completed at the Allison Div. of General Motors Corp. at Indianapolis. Details of this plant and how system operates are given in illustrated reprint from STEEL which was prepared by Mr. L. I. Couch, president of the L. I. Couch Co.

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NEW PRODUCTS and equipment

film fails to advance properly. Remington Rand Inc., Dept. ST, 315 Fourth Ave., New York 10, N. Y.

FOR MORE DATA—CIRCLE REPLY CARD NO. 6

Industrial Safety Switches

. . . exclude dust, oil, coolant

NEMA XII safety switches—complete line of devices in special industry enclosures — meet processing and machine tool industry needs. Applications extend to any

plant requiring a switch enclosure that excludes dust, dirt, oil and coolant.

Box is formed and welded from heavy gage steel; cover is sealed by neoprene gasket. No conduit opening or knockouts are provided, each installation being tailor-made. Square D Co., Dept. ST, 6060 Rivard St., Detroit 11, Mich.

FOR MORE DATA—CIRCLE REPLY CARD NO. 7

Movable Miller, Facer

. . . surfaces to 84 inches wide

Movable universal milling and facing machine handles heavy duty jobs or those so situated as to make removal to the machine shop impractical. Specific applications are evident in resurfacing hammer bases in forge plants and on motor bases, bed plates and similar components.

Spindle speeds range from 9 to

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Line drawings and photograph show the progressive steps taken in abrasive cutting, machine facing and center hole boring the pieces from Type 304 Stainless Steel Plates.

Why waste expensive labor cutting odd shapes of stainless steel with conventional tools—when you can get just what you want from G. O. Carlson, Inc. cut to shape with our specialized cutting equipment? And don't overlook the elimination of the high cost of shipping unnecessary scrap material.

More and more fabricators are saving money and time by "letting Carlson do it"—which means one order for plates and miscellaneous items cut to size, one handling, with material delivered ready for either finish machining or fabrication.

Stainless steel to chemical industry standards is our only business. The pattern cutting, abrasive cutting, rough machining, and sawing techniques we use are regular services on which our customers depend to cut their costs to the bone! Your inquiry will receive prompt attention.

Stainless Steel is our only business . . . and we know it

G. O. CARLSON, INC.

Stainless Steels Exclusively

300 Marshalton Road, Thorndale, Pa.

PLATES • FORGINGS • BARS • SHEETS (No. 1 Finish)

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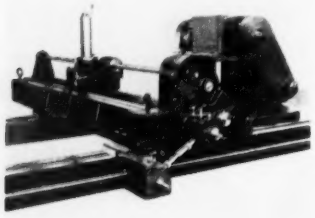
72 rpm; cutters from 3 to 15 inches in diameter can be used. Any surface angle can be maintained



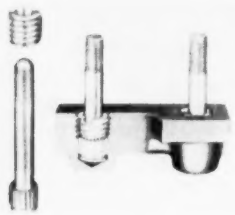
and surfaces up to 84 inches wide milled accurately. Forney's Inc., Dept. ST, Box 310, New Castle, Pa.

FOR MORE DATA—CIRCLE REPLY CARD NO. 8

Threaded Studs

. . . for metal and plastic

Threaded studs can be installed in metal or plastic, differing from conventional units through provision of knurled head and pressure ring. Units have positive lock against rotation and pullout.



Knurled head broaches its way into base material and holds stud securely against rotation. The pressure ring, screwed in place, positively locks the stud against being pulled out. In event of damage to stud, pressure ring can be pulled out and replaced. The same pressure ring can be reused. Newton Insert Co., Dept. ST, 1321 E. 17th St., Los Angeles 21, Calif.

FOR MORE DATA—CIRCLE REPLY CARD NO. 9

Vapor Degreaser

. . . thorough job in 50 seconds

Manpro B-121 vapor degreaser completes thorough cleaning with one compact unit. Dirty parts or assemblies are clean, warm and dry in less than 50 seconds. Design features: Two vapor-controlling condensers; 31 x 20 x 16-inch work clearance; divided tank to provide boil sump and spray pump sump; pressure spray; and the manufacturer's Bar-L unit which has two safety thermostats.

The degreaser can be installed in

15 minutes. Its normal capacity is 500 pounds of steel per hour. Manufacturers Processing Co., Dept. ST, 1360 Hilton Rd., Detroit 20, Mich.

FOR MORE DATA—CIRCLE REPLY CARD NO. 10

Pipe Threading Machine

. . . range: 1 to 4 inches

Pipe threading machine, the 4-inch No. 784 model, is a heavy-duty floor type with standard 1 to 4-inch range and extra range of $\frac{1}{2}$ and $\frac{3}{4}$ inch. Model is equipped with a front chuck that requires no wrench for operation and is built for frequent pipe size changes. A spin of the handwheel moves gripping jaw through the entire range in a few seconds.

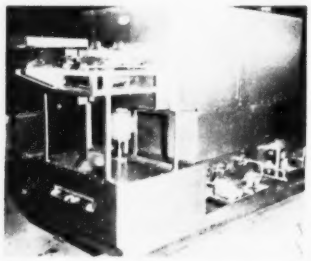
Model has four spindle speeds, controlled by levers located for operator's convenience. Two detachable lever-operated die heads cover the entire pipe and bolt range and are adjustable for over or under-size threads. Oster Mfg. Co., Dept. ST, 2057 E. 61st Place, Cleveland 3, O.

FOR MORE DATA—CIRCLE REPLY CARD NO. 11

Automatic Heat-Treater

. . . production line operation

This production line unit is completely automatic and can be used for clean heat-treating, carburizing and dry cyaniding parts that do not have to be handled on trays. No operator is required. The Unitline can be placed in a production line to take parts from a conveyor and deliver them to a discharge conveyor. No transfer of parts being processed is required. Furnace can be made for individual running of one to four different



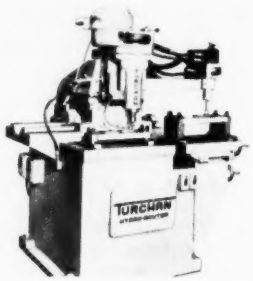
parts simultaneously at individual cycles and fired by either gas or electricity. Production capacity is 75 to 500 pounds per hour in at least six different sizes. Ferguson Equipment Corp., Dept. ST, 21st St. & Penn Ave., Pittsburgh 22, Pa.

FOR MORE DATA—CIRCLE REPLY CARD NO. 12

Tracer-Controlled Miller

. . . hydraulic tracer control

Automatic tracer-controlled milling and routing machine adapts quickly and easily to changeovers. Fingertip operation is accomplished through hydraulic servo control. The unit produces effortless, accurate positioning of vertical spindle slide, ram and ram slide



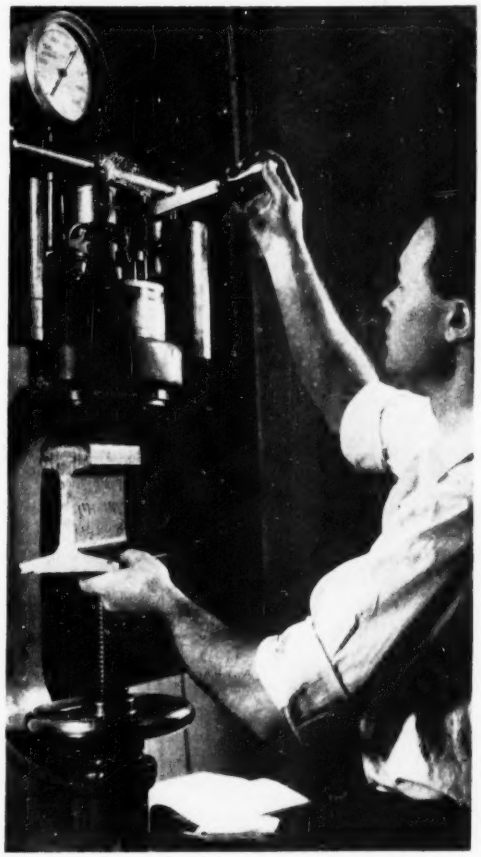
whereby the tool reproduces the same form as dictated by tracer stylus in contact with master. Operator fatigue is virtually eliminated.

All hydraulic feeds are at infinitely variable rates, with stepless automatic tracer control. Stationary work table is attached to sturdy machine base to eliminate vibrations.

Micrometer dials reading in 0.001-inch facilitate setups and rapid handling. Turchan Follower Machine Co., Dept. ST, 8259 Livernois, Detroit 4, Mich.

FOR MORE DATA—CIRCLE REPLY CARD NO. 13

ASTM HARDNESS TESTS FOR WROUGHT STEEL PRODUCTS



Definition: Test is a means of determining resistance to penetration.

Tests: Either Brinell or Rockwell shall be used.

Brinell test:

Apparatus: Equipment shall meet following specifications:

A. Testing machine shall be used in range in which it is accurate within 3 per cent.

B. Micrometer microscope or equivalent device shall be adjusted so error of reading in range covered does not exceed 0.02 mm.

C. Standard ball 10 mm in diameter shall not have a deviation of more than 0.01 mm in any diameter. It must not show a permanent change in diameter greater than 0.01 mm when pressed with force of 3000 kg against test specimen.

Specimen: Thickness of piece must be such that no bulge, or other marking showing effect of load, appears on side of piece opposite indentation.

Procedure: Following standards shall be observed:

A. Distance of center of indentation from edge of specimen or another indentation must be at least three times diameter of indentation.

B. Load shall be applied for a minimum of 10 seconds.

C. Two diameters of indentation at right angles shall be measured to nearest 0.1 mm, estimated to nearest 0.05 mm and averaged to nearest 0.05 mm. If two diameters differ more than 0.1 mm, readings shall be discarded.

D. Steel ball shall not be used on steels having hardness over 444 BHN nor carbide ball over 627 BHN. Test is not recommended for harder materials.

E. In reporting hardness values, diameter of ball and load must be stated except when a 10-mm ball and 3000-kg load are used.

Rockwell test:

Procedure: Reference shall be made to latest revision of "Standard Methods of Test for Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials," ASTM Designation: E:18.

Reporting: In reporting hardness values, scale symbol shall precede hardness number, such as B96, C40, 15N75, 30T77.

Test block: Standard Rockwell test blocks shall be used to check machines.

Continued from p. 75

uct. 2. Erroneous test results are likely to stem from improper machining or preparation of test specimens. 3. Specimens containing flaws should not be tested. 4. If any test fails because of mechanical reasons, such as failure of test equipment, test specimen may be discarded.

Tension Test — Machine specimen or full section is subjected to a stress sufficiently large to rupture it. Information gained includes such values as proportional limit, yield strength, proof stress, yield point, tensile strength, percentage of elongation and percentage in reduction of area.

Practical import of standards in this area is this: Now when the engineer or executive reads that the tension specimen has been aged, for instance, he'll know that aging was from 24 to 48 hours at room temperatures; or if faster aging was employed, that it was at moderately elevated temperatures in water, oil or in an oven. When yield strength is mentioned, he'll know that the offset or total extension under load methods was used.

Bend Test—This is one method of finding ductility, but, ASTM warns, it cannot be considered a quantitative means of predicting service performance in bending operations.

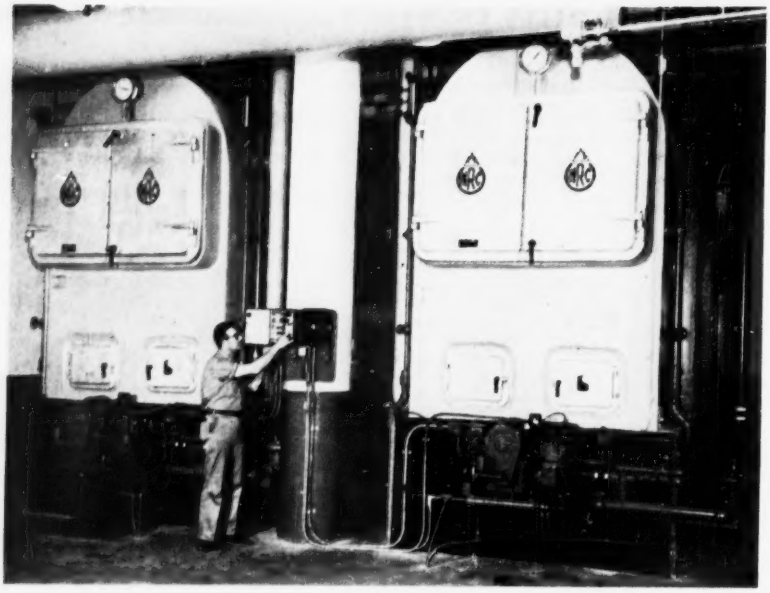
What does ASTM recommend? The Society specifies that specimen shall be bent to an inside diameter at room temperature, as designated by applicable product specifications. Point to watch is major cracking on the outside of the bent portion.

What about aging? Requirements are the same as in tension testing.

Hardness Test — Value found here is resistance to penetration. Hardness data can be converted into approximate tensile strength values. Shortcut is permissible, according to ASTM, when agreed upon. Typical case would be to expedite testing of a large number of duplicate pieces from the same lot.

Tests recommended are Brinell and Rockwell.

Brinell—Specified load is applied to a flat surface of the specimen by a hard ball of specified diameter. Average diameter of the indentation is used as a basis for calculation of the Brinell hardness



Twin Fuel, Dual Purpose Boilers

These two boilers use two fuels and supply two heating services at the CBS television city in Los Angeles. Equipped with gas-oil combination burners, the National Radiator Co. boilers supply steam to two 600 rpm heat exchangers for hot water supply. Low pressure steam from the boilers also is piped to rooftop utility rooms where it circulates through copper coils in the heating portion of heating-air conditioning system. Boilers each have 8,743,000 Btu capacity

number, designated as BHN.

In general, hardness requirements should not be applied to untreated material. Range of hardness is properly confined only to quenched and tempered or normalized and tempered material. For annealed material, a maximum figure only should be specified. Minimum or maximum hardness may be specified by agreement for normalized material.

Rockwell — Either a 1/16-inch steel ball or diamond brale is used to determine hardness in this test. Value is obtained on a direct reading machine which measures hardness by determining the depth of penetration of the diamond brale or steel ball into the specimen under arbitrarily fixed conditions.

When using the diamond brale, for instance, initial penetration of the test coupon is under a 10 kg load; then a major load of 150 kg is applied. Rockwell hardness number is proportional to the difference in penetration between the major and minor loads.

Impact Test—ASTM recommends either the Charpy or Izod tests. With either machine, a notched specimen is broken by a single blow of a freely swinging pendulum, which is released from a fixed height. Energy of the blow is fixed and known. Height to which pendulum rises in its backswing after breaking the specimen is measured and used to determine the residual energy of the pendulum.

Notch behavior indicated in an individual test applies only to the specimen tested.

Generally, minimum impact requirements are specified only for quenched and tempered, normalized and tempered or normalized materials.

Procedure—In the Charpy machine, the specimen is supported horizontally as a simple beam with the axis of the notch vertical. It is struck in the middle on the face opposite the notch.

When using the Izod machine, the specimen is clamped in a vise with its axis vertical. Root of notch is flush with top face of vise. Specimen is struck near the free end of the notched face.

Since results may vary greatly with the temperature at which the test is conducted, ASTM recommends careful recording of test temperatures.

CALENDAR
OF MEETINGS

September 1-4, American Institute of Electrical Engineers: Pacific general meeting, Hotel Vancouver, Vancouver, B. C. Institute address: 33 W. 39th St., New York 18. Secretary: H. H. Henline.

September 2, Steel Kitchen Cabinet Manufacturers Association: Fall meeting, Hotel Cleveland, Cleveland. Association address: 1008 Engineers Bldg., Cleveland 14. Secretary: Arthur J. Tuscany Jr.

September 6-11, American Chemical Society: Fall meeting, Hotel Conrad Hilton, Chicago. Society address: 1155—16th St., NW, Washington 6. Assistant secretary: R. M. Warren.

September 9, Material Handling Institute: Fall meeting, Hotel Cleveland, Cleveland. Institute address: 813 Clark Bldg., Pittsburgh 22. Managing director: R. Kennedy Hanson.

September 9-11, Compressed Air & Gas Institute: Fall meeting, Fishers Island Country Club, Fishers Island, N. Y. Institute address: 122 E. 42nd St., New York 17. Secretary: Frank P. Anderson.

September 10-12, Rocky Mountain Management Club: Rocky Mountain industrial exposition, University of Denver arena. Club address: 1031 15th St., Denver 2. Executive secretary-treasurer: Harold S. Craig.

September 11-13, Metal Powder Association: Fall meeting, The Greenbrier, White Sulphur Springs, W. Va. Association address: 420 Lexington Ave., New York 17. Secretary: Robert L. Ziegfeld.

September 13-16, Electrochemical Society Inc.: Fall meeting, Ocean Terrace hotel, Wrightsville Beach, N. Carolina. Society address: 216 W 102nd St., New York 25. Secretary: Dr. Henry B. Linford.

September 13-16 American Institute of Chemical Engineers: Fall meeting, Hotel Fairmont, San Francisco. Institute address: 120 E. 41st St., New York 17. Secretary: Stephen L. Tyler.

September 14-15, American Machine Tool Distributors Association: Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Association address: 1900 Arch St., Philadelphia 3. Executive secretary: Thomas A. Fernley Jr.

September 14-15, American Hot Dip Galvanizers Association Inc.: Semi-annual meeting, Statler hotel, Cleveland. Association address: 1506 First National Bank Bldg., Pittsburgh 22. Secretary-treasurer: Stuart J. Swensson.

September 14-16, Allied Railway Supply Association: Annual meeting, Hotel Sherman, Chicago. Association address: 1200 W. Chase Ave., Chicago 26. Secretary: Charles F. Weil.

September 14-17, Society of Automotive Engineers Inc.: National tractor meeting and production forum, Hotel Schroeder, Milwaukee. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

September 14-18, Industrial Engineering Conference: Michigan State College, East Lansing, Mich. Information: James M. Apple, Dept. of Mechanical Engineering, Michigan State College, East Lansing, Mich.

September 16-18, Porcelain Enamel Institute: Shop practice forum, Ohio State University, Columbus, O. Institute address: 1346 Connecticut Ave., NW, Washington 6. Secretary: John C. Oliver.

September 17, Material Handling Institute: Closed meeting with Wayne University and Detroit Board of Commerce on control and management of major investments in material handling, Engineering Society of Detroit, Rackham Memorial. Institute address: 813 Clark Bldg., Pittsburgh 22. Managing director, R. Kennedy Hanson.

September 17-18, National Foundry Association: Annual meeting, Plaza hotel, New York. Association address: 53 W. Jackson Blvd., Chicago 4. Executive secretary: Charles T. Sheehan.

September 18, Wire Association: Nonferrous division's Waterbury regional meeting, Elton hotel, Waterbury, Conn. Association address: 453 Main St., Stamford, Conn. Executive secretary: Richard E. Brown.

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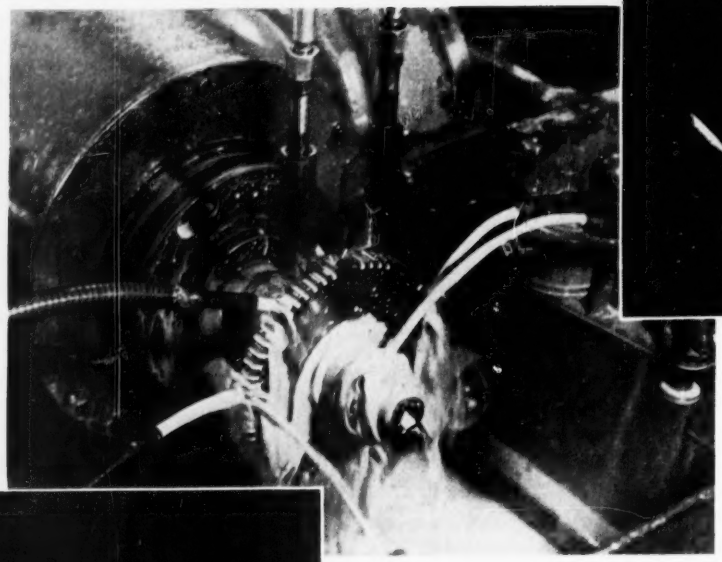
GEAR STEELS:



Flame hardening of gear teeth is accomplished on a Gleason machine. The etched sections show hardness pattern on both sides of tooth while allowing core to remain softer, about Rc 30

Heat Treating

GIVES THEM LIFE

More important than the physicals are fatigue and shock resistance. Getting around problems of cutting harder steels led Monarch up some interesting new channels

ALL FACTORS such as strength, wear resistance and accuracy are of great importance in the manufacture of gears. No one property tells the whole story. For instance, the strength of steel, determined on the basis of its tensile strength, cannot be considered as a sufficient criterion for a given material. Endurance limit and shock resistance are much more important.

Both endurance limit and shock resistance differ when determined in the direction of grain flow of the hot material (when rolled or forged) and in a direction perpendicular to the grain flow.

An Example—Gears machined from round bar stock will not be as strong as those machined from upset blanks of the same material. Thus, power gears are better when fabricated from forgings. The grain flow of the material should always be checked.

For many years, gears for machine tools and cranes were manufactured of a carbon steel containing from 0.20 to 0.35 per cent carbon.

A steel having 0.40 to 0.50 per cent carbon was considered too brittle and its machinability presented some difficulties.

Hardness Boosted — Since alloy steels and different heat treating processes have been developed, and extremely high tensile strength can be combined with fair shock resistance and good endurance limit, the hardness of gears can be increased considerably. Both strength (that is tensile strength, shock resistance and endurance limit) and wear resistance can be greatly improved. This progress, however, is limited by the cutting ability of tools.

Cutting and shaving of teeth on a material having a Rockwell C 28 to 32 hardness is considered reasonable even though the tool wear may be considerable. Consequently, gears having a higher hardness should be heat treated after cutting and finishing teeth. Every heat treat causes distortion which may be reduced, however, to a minimum by the proper heat treat process.

FURNACE HEAT-TREATED GEARS

If the hardness required doesn't exceed Rc 35, distortion is not a problem, since gears can be finished later. However, distortion becomes a problem if the hardness required is high, say Rc 40 to 50, and if grinding of the teeth is not possible in this instance.

In such cases, material should be carefully annealed before machining. Annealing is needed not only to reduce the hardness and to ease machining, but also to prepare

By JOHN OBREBSKI
Metallurgist
Monarch Machine Tool Co.
Sidney, O.

CARBURIZING AND HEAT TREATING AT MONARCH

As Developed by the Author

1. Carburizing in a high temperature (1850 to 1920° F)
2. Direct quenching in a warm salt bath (400° F) or in air if the nickel content is above 2.50 per cent.
3. Annealing (1050 to 1070° F)
4. First quenching in a warm salt bath
5. Second quenching in oil or water
6. Stress relieving in boiling water

Wear resistance is improved and finished hardness of case is Rc 60 to 62

the steel for final heat treatment and reduction of distortion.

Heating for hardening should be uniform. A proper quenching-oil circulation is required. Some alloy steels may be subjected to a warm salt bath quenching. In this way, distortion is reduced to a minimum. Heat treating with no distortion is impossible.

Steel Choice—In many instances, nickel, nickel-chromium, nickel-molybdenum, and nickel-chromium-molybdenum steels have been used for furnace-hardened gears. In all of these steels, carbon content has been kept low (0.25 to 0.37 per cent) and high mechanical properties achieved by alloying elements. Among these, nickel increases impact values remarkably and the hardness may be high, especially if chromium and molybdenum are present. Nickel-chromium-molybdenum steel is an excellent material for heavily-loaded gears, working under unusually severe conditions.

Due to shortage of nickel, chromium-molybdenum, chromium-vanadium and manganese-vanadium steels were developed during the war.

Instead of furnace heating, salt bath heating for hardening was recommended for these new steels. Cyanide was added to the salt to produce a thin cyanided case on the tooth surface. It also increases the life of the gear slightly.

CARBURIZED GEARS

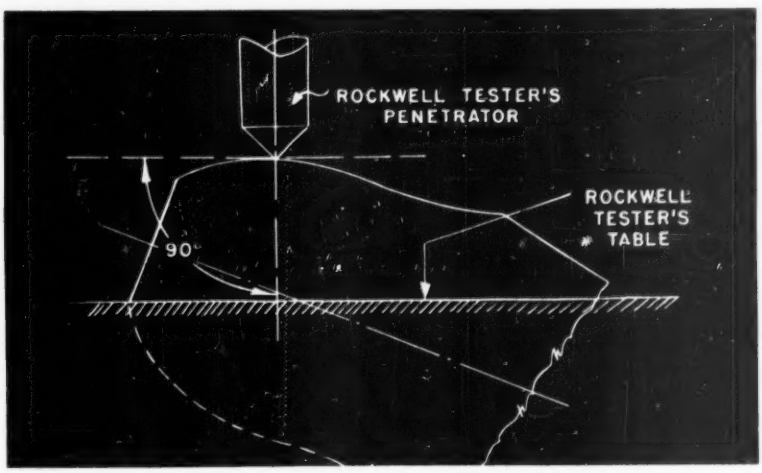
Wear resistance problems lead to carburized parts and gears. Nickel and nickel-chromium as well as nickel-chromium-molybdenum steels have been used. Nickel content runs as high as 5 per cent. Steels with 0.15 per cent carbon, 3.50 per cent nickel and 1.00 per cent chromium have been used in many places.

Where steel mills asked for larger limits for the carbon content, a limit of 0.17 per cent maximum was established for some alloy steels. The familiar slogan, "soft core and hard case," doesn't reflect the situation correctly. Gears have had a comparatively hard core, Rc 40 to 50, and a hard case, 58 to 60.

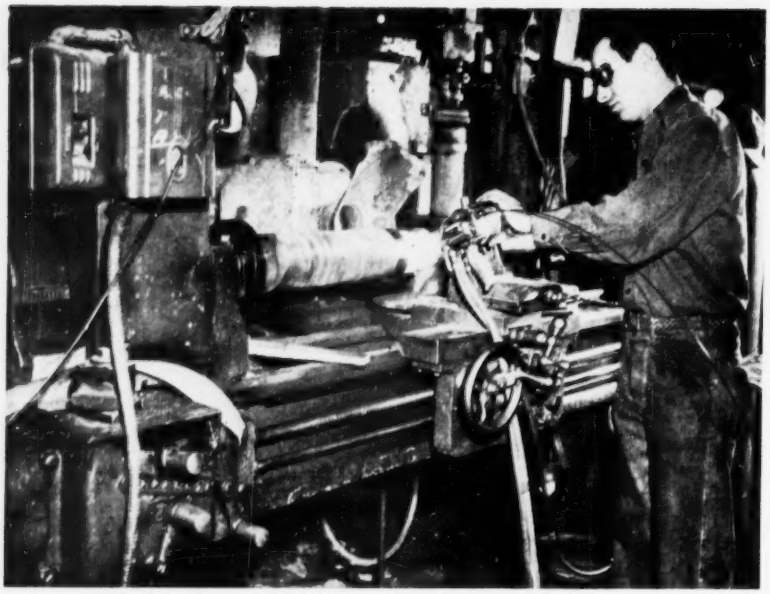
Author's Method — Final heat treatment of carburized gears has been the subject of large scale discussions. Direct quenching, slow cooling and double quenching (with grain refining core and case) are used widely. Salt bath carburizing and salt bath heating before quenching are recommended and used. A technique is shown in accompanying box.

An unusually high carburizing temperature has been employed for two reasons. First, the carburizing time can be considerably reduced; and second, the maximum carbon content in the carburized case is about 1.40 per cent and the hardness of the case is improved.

Good Results—Direct quenching from the carburizing temperature prevents formation of carbides on the grain boundaries. Annealing serves to decompose austenite. This results in fine, uniformly dispersed carbide particles. Since unusually high carburizing temperature causes a grain growth, double hardening cannot be avoided. Some distortion must be taken into consideration as the carburizing and



System for measuring tooth hardness at the pitch line



10-Minute Salvage for Mismachined Axles

Metallizing for salvage of parts accidentally mismachined in production proves valuable for this heavy roadbuilding equipment manufacturer. A typical application is salvaging stub axles—5-inch bar stock, 30 inches long—machined undersize at one of the bearing fits. Seen above, the part is set up in a lathe, cleaned, then sprayed for 10 minutes to achieve required dimension. Many axles have been in service 18 months without failure of metallized parts

quenching are performed after the cutting and shaving of teeth.

The Germans carefully examined all parts of U. S. and British planes shot down during the war. A German magazine pointed out, "Some gears of an English airplane were made of an alloy steel and carburized. The carburized case was ground off of some of the teeth; however, the hardness of the core was high enough to prevent an excessive wear. It is completely understandable. Carburizing alloy steels may be hardened to a high core hardness. If the carbon content is as high as 0.17 to 0.25 per cent, and if it is steel containing a lot of alloying elements, the core hardness may reach Rc 40 to 50."

Even before the war, nickel was banned from the German automotive industry and many substitute steels were developed. Nickel-free steels have a much lower shock resistance than steels containing nickel. In spite of this fact, the gears will perform well and carburizing steels often are used with success on gear applications.

The chief factors which affect quality in carburized gears are four:

1. Harmful free carbides located on austenite grain boundaries.

2. Useful free fine carbides in a globular form, uniformly dispersed.

3. Carbon content in the case not beyond 0.90 per cent in plain carbon steels, nor beyond 0.80 per cent in some alloy steels if carburized gears are slow cooled and then rehardened.

4. Carburizing temperature normally of at least 1650° F, that causes a grain growth in several grades of the carburizing steels. Refining of the grain (single or double hardening) is then needed.

Referring to No. 3, if a direct quenching from the carburizing temperature is employed, the maximum carbon content should not exceed 1.70 per cent as a theoretical limit of the solid solution of carbon in gamma iron. Practically the carbon content does not exceed 1.10 per cent.

In qualifying No. 4, some alloying elements, such as molybdenum, are able to keep the grain very fine in spite of high carburizing temperatures and a comparatively long carburizing time. Application of such steels allows a direct quenching from the carburizing temperature. Eventually gears may be cooled in air or in the furnace to a lower temperature and then quenched.

Composition Is Key — Direct quench has many advantages. It should not be overlooked, however, that the hardness of the core material depends largely on the chemical composition of the given steel and much less on the quenching temperature. Small differences in the carbon content of the core material may cause large differences in the core hardness.

FLAME-HARDENED GEARS

To combine all the advantages of furnace hardened gears and carburized gears and to avoid, whereever possible, costly grinding of teeth, modern methods, such as flame and induction hardening of teeth, have been developed. Induction hardening does the job in some cases. Flame hardening has found a wide application in the case of larger diameter gears.

One method of flame hardening consists of hardening the teeth throughout the whole section, even below root diameter. After such hardening, gears should be stress relieved. The material may be comparatively soft when machined and the wear on tools reduced to a minimum. However, such hardening causes some distortion.

Flame hardening of the working surfaces of teeth causes only a minimum of distortion, but the material must be hardened and tempered after cutting and finishing of teeth.

Experimental work on the flame hardening of gear teeth has been done in Monarch's own research laboratory. Both sides of every tooth are hardened, allowing the core to remain softer, about Rc 30. This hardening operation is performed on a Gleason machine.

Largest Lifting Magnet Built

Largest diameter electro-magnet for handling scrap was built by the Electric Controller & Mfg. Co., Cleveland. The new 80-inch magnet is of all-welded construction. Because of its large diameter, it is especially useful on light-weight, or "wind-blown" scrap.

STAINLESS STEEL FOR BUILDINGS

McLouth STAINLESS Steel

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Manufacturers of Stainless and Carbon Steels

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Memo to
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May we be of help to you?
We are at your service
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Makers of
AMERICAN PHILLIPS Screws

American PHILLIPS Wood Screws with sharp gimlet points, sharp threads, well-formed heads.

American PHILLIPS "TWINfast" Wood Screws with twin threads for greater driving speed.

American PHILLIPS Machine Screws for fastest driving in drilled or tapped holes (or with nuts).

American PHILLIPS Type 23 Thread-Cutting Screws, for metals.

American PHILLIPS Type 1 Thread-Cutting Screw taps its own thread in metal *as it's driven.*

Above and below are shown American PHILLIPS Sems* Assemblies, preassembled lock washers and screws save assembly time.

*(U. S. PATENTS NO. 2,113,424 AND 2,113,485.)

American PHILLIPS Type B Tapping Screws, for assembling heavy sheet metal.

American PHILLIPS Type A Tapping Screws, for faster fastening of light-gage sheet metal.

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STEEL
August 31, 1953

Market Outlook

THE steel buyer's position is getting stronger all the time.

You can see that from the continued easing in demand for steel, a decline in steel output and a downward break in prices of steelmaking scrap.

WHY— Demand is easing because users think their steel needs will be less urgent than they were. The rate of steel output is slipping off largely because producers feel less urgency in demand. In the face of those situations the prices of scrap, one of the important raw materials used in making steel, are taking a nosedive. Not only does this drop in scrap prices reflect current conditions but it may foretell something of the future. Scrap is historically a bellwether of business conditions in the steel industry. What happens to scrap often happens to steel several months later. Last April, scrap prices dropped markedly. Now on every hand there's evidence of an easing in steel demand. The newest drop in scrap prices suggests a continuation of the easing in steel demand and production. Under those circumstances the steel buyer would become king. He could get what he wants when he wants it.

SLOWDOWN—Reflecting the waning of urgency in steel demand, STEEL's rate of steel output in the week ended Aug. 29 equaled the lowest mark of this year, 94.5 per cent of capacity, set in the week ended July 11 when steel plant vacations were at their height. Since the week ended June 8, steel output has not been as high tonnagewise in any week as it was in each of this year's 23 weeks prior to June 8. Part of the decline in output comes from time out for furnace repairs by producers who feel they now can take out such time.

At 94.5 per cent of capacity, the national rate of steelmaking was 1.5 points below that of the preceding week.

DECEIVING— A drop now in the percentage rate of steel production actually constitutes a greater lack of use of steelmaking facilities than is displayed by the percentage figures. Steelmaking capacity is still going up and should reach 119 million net tons by year end, but the operating rates are still calculated on the Jan. 1, 1953, capacity of 117.5 million tons. For an operating rate to hold steady, production has to increase. When the rate goes down, there is more idle equipment than the percentage figure indicates.

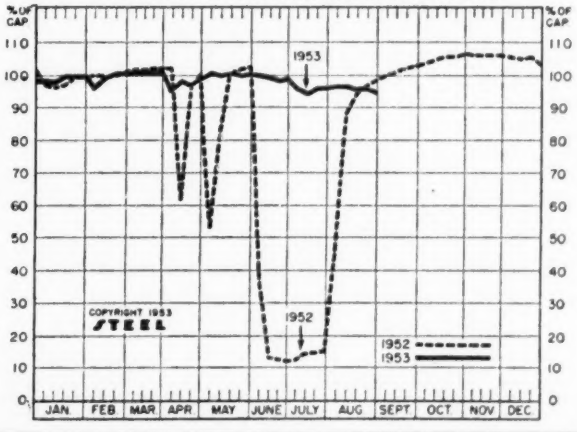
MARKDOWN—The downward break in scrap prices of as much as $5 a ton carried STEEL's composite price on steelmaking grades down to $42.17, a $1 decline from the preceding week.

A sign of increased availability of steel is the announcement by Worcester Pressed Steel Co., Worcester, Mass., that for the first time since World War II started it is offering low carbon cold-rolled strip and cold-finished bars on the open market. Since the early 1940s, the company's rolling capacity has been used for its own stamping plant and for rolling on contracts.

EASE-UP ON BARS— The easing that has been noticeable in the last two weeks in the demand for large hot-rolled carbon steel bars appears destined to become even more pronounced.

With so many signs pointing to the end of the steel shortage, buyers are less inclined than they were to place steel orders far ahead of deadlines.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of capacity engaged at leading production points)

	Week Ended Aug. 29	Change	Same Week 1952	Same Week 1951
Pittsburgh	95	— 0.5*	98	97.5
Chicago	97	— 3.5	101	103
Mid-Atlantic	96	0	95	100.5
Youngstown	106	0	106	106
Wheeling	94	+ 2	94.5	97.5
Cleveland	103	+ 1*	104.5	101.5
Buffalo	106.5	0	104.5	104
Birmingham	94	0	100	100
New England	85	— 5	92	92
Cincinnati	75.5	—16	90	101
St. Louis	94.5	— 8.5	90	87
Detroit	106	— 3	106	100
Western	102.5	0	107	102
Estimated National Rate	94.5	— 1.5	98.5	100

*Change from preceding week's revised rate.

Weekly steelmaking capacity is estimated at 2,274,459 net tons in 1953; 2,077,040 tons in 1952; 1,999,034 tons in 1951.

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PRICE INDEXES AND COMPOSITES

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics) Week Ended Aug. 25, 1953

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, standard, No. 1	$4.400	Bars, H.R., alloy	$8.675	Strip, C.R., stainless, 430 (lb)	$0.415	Tin plate, hot-dipped, 1.25 lb	$8.433
Rails, light, 40 lb	5.767	Bars, H.R., stainless, 303 (lb)	0.418	Strip, H.R., carbon	5.113	Tin plate, electrolytic, 0.25 lb	7.133
Tie Plates	5.125	Bars, H.R., carbon	4.850	Pipe, black, buttweld (100 ft)	14.454	Black plate, can making quality	6.233
Axles, railway	7.250	Bars, reinforcing	4.775	Pipe, galv., buttweld (100 ft)	17.595	Wire, drawn, carbon	7.713
Wheels, freight car, 33 in. (per wheel)	47.000	Bars, C.F., carbon	7.860	Pipe, line (100 ft)	141.960	Wire, drawn, stainless, 430 (lb)	0.545
Plates, carbon	4.550	Bars, C.F., alloy	11.075	Casing, oil well, carbon (100 ft)	149.516	Bale ties (bundle)	5.653
Structural Shapes	4.383	Bars, C.F., stainless, 302 (lb)	0.433	Casing, oil well, alloy (100 ft)	214.113	Nails, wire, 8 d common	7.530
Bars, tool steel, carbon (lb)	0.415	Sheets, H.R., carbon	4.765	Tubes, boiler (100 ft)	‡	Wire, barbed (80-rod spool)	6.847
Bars, tool steel, alloy, oil hardening die (lb)	0.505	Sheets, C.R., carbon	5.904	Tubing, mechanical, carbon (100 ft)	‡	Woven wire fence (20-rod roll)	16.174
Bars, tool steel, H.R. alloy, high speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.80 (lb)	1.094	Sheets, galvanized	7.015	Tubing, mechanical, stainless, 304 (100 ft)	161.193	‡Not available.	
Bars, tool steel, H.R. alloy, high speed W18, Cr 4, V 1 (lb)	1.730	Sheets, C.R., stainless, 302 (lb)	0.548				
		Sheets, electrical	9.183				
		Strip, C.R., carbon	7.371				

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	Aug. 25 1953	Aug. 18 1953	Month Ago	July Average
(1947-1949=100)	141.7	141.7	141.7	141.7

STEEL's FINISHED STEEL PRICE INDEX

	Aug. 27 1953	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	189.38	189.38	189.38	181.31	143.08
Index in cents per lb.	5.130	5.130	5.130	4.912	3.876

STEEL's ARITHMETICAL PRICE COMPOSITE*

	Aug. 27 1953	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Finished Steel, NT	$115.56	$115.56	$115.56	$110.98	$95.05
No. 2 Fdry, Pig Iron, GT	56.54	56.54	56.54	55.04	44.30
Basic Pig Iron, GT	56.04	56.04	56.04	54.66	43.86
Malleable Pig Iron, GT	57.27	57.27	57.27	55.77	44.68
Steelmaking Scrap, GT	42.17	43.17	44.08	43.00	43.33

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

COMPARISON OF PRICES

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Aug. 27 1953	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.15	4.15	4.15	3.95	3.45
Bars, H.R., Chicago	4.15	4.15	4.15	3.95	3.35
Bars, H.R., del. Philadelphia	5.302	5.302	5.302	4.502	3.79
Bars, C.F., Pittsburgh	5.20	5.20	5.20	4.925	3.95
Shapes, Std., Pittsburgh	4.10	4.10	4.10	3.85	3.25
Shapes, Std., Chicago	4.10	4.10	4.10	3.85	3.25
Shapes, deld., Philadelphia	4.38	4.38	4.38	4.13	3.48
Plates, Pittsburgh	4.10	4.10	4.10	3.90	3.50
Plates, Chicago	4.10	4.10	4.10	3.90	3.40
Plates, Coatesville, Pa.	4.35	4.35	4.35	4.35	3.75
Plates, Sparrows Point, Md.	4.10	4.10	4.10	3.90	3.45
Plates, Claymont, Del.	4.55	4.55	4.55	4.35	3.95
Sheets, H.R., Pittsburgh	3.925	3.925	3.925	3.775	3.275
Sheets, H.R., Chicago	3.925	3.925	3.925	3.775	3.25
Sheets, C.R., Pittsburgh	4.775	4.775	4.775	4.575	4.00
Sheets, C.R., Chicago	4.775	4.775	4.775	4.575	4.00
Sheets, C.R., Detroit	4.975	4.975	4.975	4.775	4.20
Sheets, Galv., Pittsburgh	5.275	5.275	5.275	5.075	4.40
Strip, H.R., Pitts.	3.975-4.425	3.975-4.425	3.975-4.425	3.75-4.225	3.275
Strip, H.R., Chicago	3.925	3.925	3.925	3.725	3.275
Strip, C.R., Pittsburgh	5.45-5.95	5.45-5.95	5.45-5.95	5.10-5.80	4.00
Strip, C.R., Chicago	5.70	5.70	5.70	5.35	4.125
Strip, C.R., Detroit	5.45-6.05	5.45-6.05	5.45-6.05	5.30-6.05	4.20
Wire, Basic, Pitts.	5.475-5.525	5.475-5.525	5.475-5.525	5.10-5.225	4.15
Nails, Wire, Pittsburgh	6.35-6.55	6.35-6.55	6.35-6.55	6.20-6.35	5.15
Tin plate (1.50 lb), box, Pitts.	$8.95	$8.95	$8.95	$8.95	$6.70

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$75.50	$75.50	$75.50	$70.50	$61.00
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$", Pitts.	4.525	4.525	4.525	4.325	3.45

PIG IRON, Gross Ton	Aug. 27 1953	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bessemer, Pitts.	$57.00	$57.00	$57.00	$55.50	$47.00
Basic, Valley	56.00	56.00	56.00	54.50	43.00
Basic, deld. Phila.	60.75	60.75	60.75	59.25	46.17
No. 2 Fdry, Pitts.	56.50	56.50	56.50	55.00	46.50
No. 2 Fdry, Chicago	56.50	56.50	56.50	55.00	43.25
No. 2 Fdry, Valley	56.50	56.50	56.50	55.00	43.50
No. 2 Fdry, deld. Phila.	61.25	61.25	61.25	59.75	46.67
No. 2 Fdry, Birm.	52.88	52.88	52.88	51.38	43.38
No. 2 Fdry (Birm.) del. Cin.	60.43	60.43	60.43	58.93	49.09
Malleable, Valley	56.50	56.50	56.50	55.00	43.50
Malleable, Chicago	56.50	56.50	56.50	55.00	43.50
Ferromanganese, Etna, Pa.	200.00†	200.00†	200.00†	228.00*	148.00*

*78-82% Mn, per gross ton. †74-76% Mn, per net ton.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pitts.	$44.50	$45.50	$44.50	$44.00	$42.75
No. 1 Heavy Melt, E. Pa.	42.50	42.50	44.25	41.50	45.50
No. 1 Heavy Melt, Chicago	39.50	41.50	43.50	42.50	41.75
No. 1 Heavy Melt, Valley	42.50	45.50	45.50	44.00	42.75
No. 1 Heavy Melt, Cleve.	41.50	44.50	45.50	43.00	42.25
No. 1 Heavy Melt, Buffalo	42.50	43.75	43.75	43.00	46.25
Rails, Rerolling, Chicago	54.50	56.00	55.50	52.50	63.25
No. 1 Cast, Chicago	41.00	42.00	41.00	48.50	70.00

COKE, Net Ton

Beehive, Furn, Connisvl.	$14.75	$14.75	$14.75	$14.75	$14.25
Beehive, Fdry, Connisvl.	16.75	16.75	16.75	17.00	17.00
Oven Fdry, Chicago	24.50	24.50	24.50	23.00	20.40

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

PRIMARY METALS AND ALLOYS

Aluminum: 99% plus, ingots 21.50, pigs 20.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 23.30; No. 43, 5% Si, 23.10; No. 142, 4% Cu, 24.40; No. 195, 4.5% Cu, 0.8% Si, 23.70; No. 214, 3.8% Mg, 24.40; No. 356, 7% Si, 0.3% Mg, 23.20.

Antimony: R.M.M. brand, 99.5% 34.50, Lone Star brand, 35.00, f.o.b. Laredo, Texas, in bulk. Foreign brands, 99.5%, 25.50-26.00 New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa.

Beryllium Copper: 3.75-4.25% Be, $40.00 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa. or Elmore, O.

DAILY NONFERROUS PRICE RECORD

	Price Aug. 27	Last Change	Previous Price	July Avg.	June Avg.	July, 1952 Avg.
Copper	29.00-30.00	Aug. 19	28.50-30.00	29.846	28.875	24.500
Lead	13.80	July 23	13.55	13.483	13.213	15.800
Zinc	11.00	Mar. 5	11.25	11.000	11.000	15.000
Tin	82.50	Aug. 26	83.00	81.577	92.918	121.500
Nickel	60.00	Jan. 14	56.50	60.000	60.000	56.500
Aluminum	21.50	July 24	20.50	20.923	20.500	19.000
Magnesium	27.00	Mar. 9	24.50	27.000	27.000	24.500

Quotations in cents per pound based on: Copper, deld. Conn. Valley; Lead, common grade, deld. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, deld. New York; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked; Aluminum, primary ingots, 99% plus, deld.; Magnesium, 99.8%, Freeport, Tex.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $2.00 per lb deld.

Cobalt: 97-99%, $2.40 per lb for 550 lb keg; $2.42 per lb for 100 lb case; $2.47 per lb under 100 lb.

Columbium: Powder, $75.00 per lb, nom.

Copper: Electrolytic 29.00-30.00 deld. Conn. Valley, 29.125-30.125 deld. Midwest; Lake 30.125 deld.; Fire refined 29.75 deld.

Germanium: 99.9%, $350.00 per lb nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $165-$175 per troy oz.

Lead: Common 13.80, chemical 13.90, corroding 13.90, St. Louis. New York basis, add 0.20.

Lithium: 98%, $10.00-13.00 per lb, depending on quantity.

Magnesium: 99.8% standard ingots 27.00, 10,000 lb or more, f.o.b. Freeport, Tex. Sticks, 1.3 in. dia., 45.00, 100 to 4999 lb.

Magnesium Alloys: AZ91B 30.50; AZ91C and alloys C, H, G and R 32.50; alloy M 34.50, 10,000 lb or more.

Mercury: Open market, spot, New York, $185-$191 per 76-lb flask.

Molybdenum: Powder, 99%, hydrogen reduced $3.40 per lb; pressed ingot $4.06 per lb; sintered ingot $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 60.0; 25-lb pigs 62.65; "XX" nickel shot 63.65; "F" nickel shot or ingots, for addition to cast iron 60.00; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $140.00-$150.00 per troy oz, nom.

Palladium: $23-$24 per troy oz.

Platinum: $91-$93 per troy oz. from refineries.

Radium: $16.00-$21.50 per mg. radium content, depending on quantity.

Rhodium: $125 per troy oz.

Ruthenium: $80-85 per troy oz.

Selenium: 99.5%, $4.25-$4.75 per lb.

Sodium: 16.50, carlots; 17.00 l.c.l.

Tantalum: Sheet, rod $42.45 per lb; powder $33.50 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, New York, 82.50.

Tungsten Powder: 98.8%, carbon reduced, 1000 lb lots $5.35 per lb deld.; less than 1000 lb $5.50; 99% plus, hydrogen reduced $7.70. Treated ingots $10.43 per lb.

Zinc: Prime western 11.00, brass special 11.25, intermediate 11.50. E. St. Louis Prime western 11.25-11.50, brass special 11.50-11.75, intermediate 11.75-12.00, high grade 12.35, special high grade 12.50, die casting alloy ingot 15.50, deld.

Zirconium: Sponge $14.00 per lb; powder 100 lb or more $7.00; less than 100 lb $8.00. (Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys 22.50-23.00; No. 12 foundry alloy (No. 2 grade) 21.75-22.50; 5% silicon alloy, 0.60 Cu max., 24.00-24.75; 13 alloy, 0.60 Cu max., 24.00-24.75; 195 alloy 22.50-24.00; 108 alloy 22.50-23.00; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.75-24.00; grade 2, 22.50-23.00; grade 3, 21.50-22.00; grade 4, 20.50-21.00.

Brass Ingot: Red brass, No. 115, 24.50; tin bronze, No. 225, 35.25; No. 245, 29.50; high-leaded tin bronze, No. 305, 28.75; No. 1 yellow, No. 405, 20.75; manganese bronze No. 421, 25.25.

Magnesium Alloy Ingot: AZ63A, 31.50; AZ91B, 31.50; AZ91C, 32.00; AZ92A, 31.50.

NONFERROUS MILL PRODUCTS

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000 lb lots, 35.36; 30,000 lb lots, 35.48; l.c.l. 35.98. Weatherproof, 100,000 lb, 36.28; 30,000 lb, 36.53; l.c.l., 37.03. Magnet wire deld., 15,000 lb or more 41.83; l.c.l., 42.58.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forging billets, $6; hot-rolled and forged bars, $6.

LEAD

(Prices to jobbers f.o.b. Buffalo, Cleveland, Pittsburgh). Sheets, full rolls, 140 sq ft or more $19 per cwt.; pipe, full coils $19 per cwt; traps and bends, list prices plus 30%.

ZINC

Sheets 23.00, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils, 19.50-20.50, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 20.75-21.75; over 12-in. 20.75-21.75.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheet, C.R. ..	86.5	67.5	92.5
Strip, C.R. ...	92.5	70.5	98.5
Plate, H.R. ...	84.5	66.5	90.5
Rod, Shapes ..	82.5	63.5	88.5
Seamless Tubes	115.5	100.5	137.5
Shot, Blocks...	....	60.0	....

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more.)

Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range Inches	Widths or Diameters, In., Inc.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	33.9	...	...
0.135-0.096	12-48	34.4	...	...
0.095-0.077	12-48	35.1	32.7	37.5
0.076-0.061	12-48	35.7	32.9	37.7
0.060-0.048	12-48	36.1	33.2	38.1
0.047-0.038	12-48	36.6	33.6	38.4
0.037-0.030	12-48	37.0	34.0	39.1
0.029-0.024	12-48	37.6	34.3	39.6
0.023-0.019	12-36	38.3	35.1	40.4
0.018-0.017	12-36	39.1	35.7	41.3
0.016-0.015	12-36	40.0	36.5	42.5
0.014	12-24	41.0	37.5	43.8
0.013-0.012	12-24	42.1	38.2	44.8
0.011	12-24	43.1	39.4	46.4
0.010-0.0095	12-24	44.3	40.5	48.0
0.009-0.0085	12-24	45.6	41.9	50.0
0.008-0.0075	12-24	47.1	43.1	51.8
0.007	12-18	48.6	44.6	54.1
0.006	12-18	50.2	46.0	59.1

* Lengths 72 to 180 inches. † Maximum diameter, 26 inches.

ALUMINUM

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or distance across flats	—Round— 11S-T3	17S-T4	—Hexagonal— 11S-T3	17S-T4
Drawn				
0.125	59.6	57.9	...	...
0.156-0.172	50.6	48.9	...	...
0.188	50.6	48.9	...	62.4
0.219-0.234	47.9	46.2	...	...
0.250-0.281	47.9	46.2	...	59.5
0.313	47.9	46.2	...	56.8
Cold-finished				
0.375-0.531	46.6	44.9	56.2	53.4
0.563-0.688	46.6	44.9	53.4	50.2
0.750-1.000	45.5	43.8	48.9	47.3
1.063	45.5	43.8	...	45.7
1.125-1.500	43.8	42.1	47.3	45.7
Rolled				
1.563	42.7	41.0	...	...
1.625-2.000	42.1	40.4	...	44.1
2.125-2.500	41.1	9.4	...	...
2.750-3.375	39.9	38.2	...	...

ALUMINUM

Plates and Circles: Thickness 0.250-3.000 in., widths or diameters 24-60 in., lengths 72-240 in.

Alloy	Plate Base	Circle Base
2S-F, 3S-F	32.4	36.3
50S-F	33.5	37.4
4S-F	34.5	39.1
52S-F	36.2	40.9
61S-T6	37.4	41.5
24S-T4*	39.3	45.4
75S-T6*	47.1	53.7

* Widths or diameters 24-48 in., lengths 72-180 in.

ALUMINUM

Industrial Roofing Sheet (0.032-in. thick): Flat, 42.75 in. wide, lengths 60-144 in., $2.838 to $6.816 per sheet. Corrugated, 35 in. wide, lengths 60-144 in., $2.862 to $6.874 per sheet. **Forging Stock:** Round, Class 1, 42.05-32.76, in specific lengths 36-144 in., diameters 0.375-8.000 in.; rectangles and squares, Class 1, 49.2 to 37.6 in random lengths 0.375-4.000 in. thick, widths 0.750-10.00 in.

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032-in. 10x60 0.004-in. 81.00, 0.125-in. 71.00, 30,000 lb and over, f.o.b. mill.

Plate: Hot-rolled, AZ31, 53.00, 20,000 lb or more 0.188-1.000 in. thick, widths to 48 in., lengths to 144 in.; raised pattern floor plate, 69.00, 20,000 lb or more, ¼-in. thick, widths 24-48 in., lengths 60-144 in.

Extrusion Stock: AZ31, Rectangles, ¼ x 2 in. 69.20, 1 x 4 in. 63.00. Rod, 1 in. 66.00, 2 in. 62.50. Tubing, 1 in. OD x 0.065-in. 87.00. Angles, 1 x 1 x ⅛-in. 72.90, 2 x 2 x ⅛-in. 67.00. Channels, 5 in. 67.80. I-Beams, 5 in. 66.20.

BRASS MILL PRICES

(Effective Apr. 1, 1953)

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	50.48b	45.98c	....	50.42	28.625	28.625	27.875
Yellow Brass	42.87	36.65d	43.16	45.78	21.375	21.125	19.625
Red Brass, 85%	47.11	46.80	47.40	49.92	25.125	24.875	24.375
Low Brass, 80%	45.09	45.68	46.23	48.80	24.125	23.875	23.375
Naval Brass	47.01	41.07	53.52	50.17	20.000	19.750	19.250
Commercial Bronze, 90%...	48.76	48.45	49.03	51.32	28.125	25.875	25.375
Nickel Silver, 10%	56.56	58.59	58.59	....	25.250	25.000	12.625
Phosphor Bronze, A, 5%....	70.50	70.75	70.75	72.25	30.625	30.375	29.375
Silicon Bronze	54.70	53.64	54.49	72.10e	27.625	27.375	26.625
Manganese Bronze	50.73	44.62	54.74	....	20.000	19.750	19.250
Muntz Metal	44.91	40.47	....	....	20.000	19.750	19.250

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 pounds, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Copper and Brass: Heavy copper and wire, No. 1 22.00; No. 2 copper 19.50-20.00; light copper 17.50; No. 1 composition red brass 16.00; No. 1 composition turnings 15.50; mixed brass turnings 9.50; new brass clippings 18.50 nom.; No. 1 brass rod turnings 13.00 nom.; light brass 10.00; heavy yellow brass 11.50; new brass rod ends 17.50 nom.; auto radiators, unsweated 11.50; cocks and faucets 13.50; brass pipe 15.00.

Lead: Heavy 11.00-11.50; battery plate 6.25-6.50; linotype and stereotype 13.25; electrotype 11.50; mixed babbitt 12.00-12.50.

Zinc: Old zinc, 4.50; new die cast scrap, 4.50; old die cast scrap, 3.50.

Tin: No. 1 pewter 40.00-45.00; block tin pipe 65.00-67.00; No. 1 babbitt 37.00-40.00.

Aluminum: 2S clippings 13.00; low copper clippings 10.00; mixed clippings 10.00; old sheet 9.00; borings and turnings 6.50; pistons and struts 6.50; crankcases 9.00; industrial castings 9.00.

Magnesium: Clippings 20.00-21.00; clean castings 19.00-20.00; iron castings, not over 10% removable Fe, 18.00-19.00.

Nickel: Sheets and clips 80.00; rolled anodes 80.00; turnings 50.00; rod ends 80.00.

Monel: Clippings 28.00-30.00; old sheet 26.00-27.00; turnings 21.00-22.00; rods 28.00-30.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Copper, Brass: No. 1 copper 23.00; No. 2 copper 21.50; light copper 20.00; refinery brass (60% copper) per dry copper content 18.50; auto radiators nom.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 42.00; light scrap 37.00.

Aluminum: 2S, 3S clippings 15.00-15.50; 51S, 52S clippings 15.00-15.50; 14S, 17S, 24S clippings 14.00-14.50; mixed clippings 14.00-14.50; old sheet 12.50-13.50; old cast 12.50-13.50; clean old cable, free of steel 14.50-16.00; borings and turnings 13.00-13.75.

INGOT MAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper, Brass: No. 1 copper 23.00-23.50; No. 2 copper 20.50-21.00; light copper 19.50-20.00; No. 1 composition borings 16.50; No. 1 composition solids 17.25; heavy yellow brass solids 13.00; yellow brass turnings 12.25; radiators 13.00.

PLATING MATERIALS

(F.o.b. shipping points, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes $2.15 per lb.

Copper: Flat-rolled 47.14, oval 46.64, base prices; electrodeposited 38.38, carload lots; cast 44.14 ton lots.

Nickel: Depolarized, less than 500 lb 92.00; 500-1999 lb 88.00; over 5000 lb 86.00.

Tin: Bar or slab, less than 200 lb $1.015; 200-499 lb $1; 500-999 lb 99.50; 1000 lb or more 99.

Zinc: Bar 20.00, bar or flat top 19.00, ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb in 100 lb drums.

Chromic Acid: Less than 2000 lb 29.00; over 2000 lb 28.75.

Copper Cyanide: Under 1000 lb 63.90, 1000 lb and over 61.90.

Copper Sulfate: 100-6000 lb 11.35; 6000-12,000 lb 11.10; 12,000-24,000 lb 10.85; 24,000-36,000 lb 10.60; 36,000 lb and over 10.35.

Nickel Chloride: 100 lb 45.00; 200 lb 43.00; 300 lb 42.00; 400-4900 lb 40.00; 5000-9900 lb 38.00; 10,000 lb and over 37.00.

Nickel Sulfate: 100 lb 37.00; 200 lb 35.00; 300 lb 34.00; 400-4900 lb 32.00; 5000-35,900 lb 30.00; 36,000 lb and over 29.00.

Silver Cyanide: Cents per ounce, 96 oz 80.625; 100 oz 78.500; 2500 oz and over 77.375.

Sodium Cyanide: Egg, under 1000 lb 19.80, 1000-19,900 lb 18.80, 20,000 lb and over 17.80; granular, add 1.0 premium to above.

Sodium Stannate: Less than 100 lb 66.20; 100-600 lb 52.10; 700-1900 lb 49.80; 2000-9900 lb 48.10; 10,000 lb or more 47.

Stannous Chloride (Anhydrous): Less than 50 lb $1.503; 50 lb $1.169; 100-300 lb $1.019; 400-900 lb 99.40; 1000-1900 lb 97; 2000-4900 lb 93.30; 5000-19,000 lb 87.20; 20,000 lb and over 81.10.

Stannous Sulfate: Less than 50 lb $1.211; 50 lb 91.10; 100-1900 lb 89.10; 2000 lb and over 87.10.

Zinc Cyanide: Under 1000 lb 54.30, 1000 lb and over 52.30.

Nonferrous Metals

It's like old times again, now that there's a seasonal lull in business in the nonferrous metals market. Everyone's price conscious

DOG DAYS in the metal market promise to end before the hot weather does.

Industry generally turns the corner from summer as September begins. From here on in it looks to the production push down the year's homestretch.

Lazy Or Wary?—Dullness of August markets can be attributed largely to a return of normalcy. There is only a scattering of requirements forms to fill out. The directives trickling out of Washington most likely concern some further whittling at the remaining controls skeleton. Working stocks are again comfortable. Prices watched now are lowest offerings from suppliers and selling prices of competitors' goods.

It all adds up to this: The pressure is off, and customary practices of several years ago are returning. Business hasn't gone sour by any means in buying and selling of metals. While much of the market inertia stems from seasonal influences of heat and vacations, present state of unrest in several major metals contributes to the slackened pace.

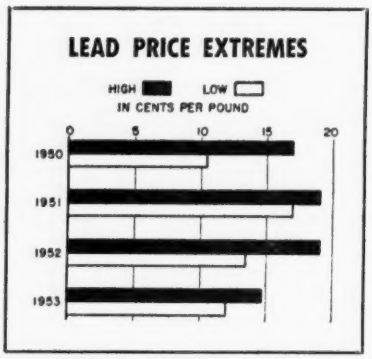
Caution in Copper—Market for copper stood at parade rest last week as integrated producers and custom smelters grimly stuck to 30-cent and 29-cent selling quotations. Buyers showed they were just as confident the price would break by staying out of the market in droves. Decision on buying Chilean copper for stockpiling came last week. While a definite yes or no didn't come for ODM, terms of the purchase were agreed on and a green light to negotiate was given the State department. Producers are accumulating unsold stocks but to no alarming degree; consumers have fair-sized inventories to work on.

Scrap Turns Up—Copper scrap is weak in nearly all grades but No. 1 and No. 2, which require less processing before coming back into the market. The two top grades actually have been bringing better prices in recent weeks, at 23 cents and 21.5 cents, respectively.

At those buying levels, a selling price of about 27 cents is indicated in the 60 to 90 days, in the eyes of the buyer. Lower grades, particularly brass and bronze ingot metal scrap, are in poor demand.

Lead Stalls—The $55-$60 smelting charge on lead battery plates denotes the current glut in lead scrap on the market. The more scrap metal that is available, the higher the smelting charge. Buying is still moderate even though battery makers and solder producers are supposed to be placing orders about now.

Production through the first seven months of 1953 stood at 307,717 tons, a gain of 9544 tons from the same period last year. Shipments totaled 282,775 tons, up 6369 tons, but stocks at the end of the month were 61,017 tons, up 4448 tons from June and up 16,877 tons from a year ago.



Uniform Zinc—For all practical purposes, the radical new delivered price system initiated this summer by American Smelting & Refining Co. has been adopted by the industry—at least while the market is sagging. Because producers are meeting the best price offered customers, they are in effect following the new procedure.

How long they'll continue to do so depends on the market, which has plenty of slack. Foreign zinc can be bought at 10 cents a pound, duty paid, in New York. This price is attracting buyers away from domestic sellers, and users are stretching inventories.

Tin Consumers Flayed

Malayan Tin Bureau, perennial Washington pressure group, rips into U. S. tin consumers who find joy in the precipitous plunge of tin prices this year. In the August issue of "Tin News," the bureau notes that the 36 per cent drop in tin prices this year has only slight effect on finished product prices, but could have powerful ramifications in international affairs. "Savings on tin coating of No. 2 cans has been reduced by slightly less than one-tenth of one per cent per can," but has "precipitated an economic and financial crisis in Malaya," resulting in closing of 74 tin mines and unemployment of 5269 miners, says the bulletin.

Copper Setasides Trimmed

First-quarter setasides of copper and copper-base alloys in military and atomic energy orders have been trimmed substantially by NPA. Copper wire mill products were cut from 26 per cent to 20 per cent and copper foundry products reduced to 27 per cent from 30 per cent. Military ammunition cups and disks continue on 100 per cent production directives while alloyed seamless tube and pipe still will require a 55 per cent setaside. In brass mill products, unalloyed plate, sheet and strip will be down from 30 to 26 per cent and rod, bar, shapes and wire will drop from 40 to 32 per cent.

Cramet Awards Contract

Cramet, newest entry in the titanium race, awarded the construction contract on its $25-million plant to Vitro Corp. of America. Plant site was not announced. A subsidiary of the Crane Co., Chicago, Cramet expects to build capacity of 6000 tons of sponge titanium yearly and is scheduled for partial operation in 1954 (STEEL, Aug. 10, p. 58).

Nonferrous Briefs

- International Nickel got $1.2 million fast tax write-off for nickel alloy tubing, rod and wire facilities at Huntington, W. Va.
- National Lead Co. has taken over distribution of all production of the government-owned Nicaro, Cuba, nickel plant.
- Listed for the first time in the ASME Boiler & Pressure Wells Code are five additional aluminum alloys. Seven aluminum sheet and plate alloys are now included. Alloy specifications for bars, rods and shapes, bolts, pipe, tube and forgings are also listed in the code for the first time.
- Tin consumers recommended to NPA that the U. S. be represented at an international conference this fall to consider an agreement on tin.

every grade of ZINC

for urgent military and

civilian requirements

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BRASS SPECIAL

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HIGH GRADE

SPECIAL HIGH GRADE

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STEEL PRICES

Mill prices as reported to STEEL, cents per pound except as otherwise noted. Changes shown in italics.
Code numbers following mill points indicate producing company; key on page 105. Key to footnotes, page 107.

—SEMIFINISHED—

INGOTS, Carbon, Forging (NT)
Fontana,Calif. K1 ....$86.00
Munhall,Pa. U5 .....59.00

INGOTS Alloy (NT)
Detroit R7 .....$63.00
Fontana,Calif. K1 ....88.00
Midland,Pa. C18 .....62.00
Munhall,Pa. U5 .....62.00

BILLETS, BLOOMS & SLABS
Carbon Rerolling (NT)
Aliquippa,Pa. J5 .....$62.50
Bessemer,Pa. U5 .....62.00
Clairton,Pa. U5 .....62.00
Ensley,Ala. T2 .....62.00
Fairfield,Ala. T2 .....62.00
Fontana,Calif. K1 ....81.00
Gary,Ind. U5 .....62.00
Johnstown,Pa. B2 ....62.00
Lackawanna,N.Y. B2 ..62.00
Munhall,Pa. U5 .....62.00
So.Chicago,Ill. U5 ....62.00
So.Duquesne,Pa. U5 ..62.00

Carbon, Forging (NT)
Aliquippa,Pa. J5 ....$75.50
Bessemer,Pa. U5 .....75.50
Buffalo R2 .....75.50
Canton,O. R2 .....75.50
Clairton,Pa. U5 .....75.50
Cleveland R2 .....75.50
Conshohocken,Pa. A3 ..82.50
Detroit R7 .....78.50
Ensley,Ala. T2 .....75.50
Fairfield,Ala. T2 .....75.50
Fontana,Calif. K1 ....75.50
Gary,Ind. U5 .....75.50
Geneva,Utah C11 ....75.50
Houston S5 .....85.50
Johnstown,Pa. B2 ....75.50
Lackawanna,N.Y. B2 ..75.50
LosAngeles B3 .....94.50
Munhall,Pa. U5 .....75.50
Seattle B3 .....94.50
So.Chicago R2,U5,W14 75.50
So.Duquesne,Pa. U5 ..75.50
So.SanFrancisco B3 ..94.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ....$82.00
Buffalo R2 .....82.00
Canton,O. R2 .....82.00
Canton,O. T7 .....84.60
Conshohocken,Pa. A3 ..89.00
Detroit R7 .....85.00
Fontana,Calif. K1 ....101.00
Gary,Ind. U5 .....82.00
Houston S5 .....92.00
Ind.Harbor,Ind. Y1 ...82.00
Johnstown,Pa. B2 .....82.00
Lackawanna,N.Y. B2 ..82.00
LosAngeles B3 .....102.00
Massillon,O. R2 .....82.00
Midland,Pa. C18 .....82.00
Munhall,Pa. U5 .....82.00
So.Chicago R2,U5,W14 .82.00
So.Duquesne,Pa. U5 ...82.00
Struthers,O. Y1 .....82.00
Warren,O. C17 .....82.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$92.50
Canton,O. R2 .....92.50
Cleveland R2 .....92.50
Fontana,Calif. K1 ..113.50
Gary,Ind. U5 .....92.50
Massillon,O. R2 .....92.50
So.Chicago,Ill. R2 ....92.50
So.Duquesne,Pa. U5 ..92.50

SHEET BAR (NT)
Fontana,Calif. K1 ....$93.18

SKELP
Aliquippa,Pa. J5 .....3.85
Munhall,Pa. U5 .....3.75
Warren,O. R2 .....3.75
Youngstown R2, U5 ...3.75

WIRE RODS
Aliquippa,Pa. J5 ....4.525
Alton,Ill. L1 .....4.70
AlabamaCity,Ala. R2...4.525
Buffalo W12 .....4.525
Cleveland A7 .....4.525
Donora,Pa. A7 .....4.525
Fairfield,Ala. T2 ....4.525
Fontana,Calif. K1 ....5.325
Johnstown,Pa. B2 ....4.525
Houston S5 .....4.925
Minnequa,Colo. C10 ..4.775
Monessen,Pa. P7 .....4.725
Joliet,Ill. A7 .....4.525
KansasCity,Mo. S5 ....4.865
LosAngeles B3 .....5.325
No.Tonawanda,N.Y. B11 4.525
Pittsburg,Calif. C11 ..5.175
Portsmouth,O. P12 ....4.725
Roebling,N.J. R5 ....4.625
So.Chicago,Ill. R2 ....4.525
SparrowsPoint,Md. B2 4.625
Sterling,Ill.(1) N15 ..4.525
Struthers,O. Y1 .....4.525
Torrance,Calif. C11 ...5.325
Worcester,Mass. A7 ...4.825

—STRUCTURALS—

Carbon Steel Stand. Shapes
AlabamaCity,Ala. R2 ..4.10
Aliquippa,Pa. J5 .....4.10
Bethlehem,Pa. B2 ....4.15
Bessemer,Ala. T2 .....4.10
Clairton,Pa. U5 .....4.10
Fairfield,Ala. T2 .....4.10
Fontana,Calif. K1 ....4.75
Gary,Ind. U5 .....4.10
Geneva,Utah C11 .....4.10
Houston S5 .....5.60
Ind.Harbor,Ind. I-2 ....4.10
Johnstown,Pa. B2 ....4.15
KansasCity,Mo. S5 ....4.80
Lackawanna,N.Y. B2 ..4.15
LosAngeles B3 .....4.80
Minnequa,Colo. C10 ....4.55
Munhall,Pa. U5 .....4.10
Niles,Calif.(22) P1 ....4.91
Phoenixville,Pa. P4 ....4.95
Seattle B3 .....4.85
So.Chicago,Ill. U5, W14 4.10
So.SanFrancisco B3 ...4.75
Torrance,Calif. C11 ....4.80
Weirton,W.Va. W6 ....4.35

Wide Flange
Bethlehem,Pa. B2 .....4.15
Clairton,Pa. U5 .....4.10
Fontana,Calif. K1 .....5.30
Lackawanna,N.Y. B2 ..4.15
Munhall,Pa. U5 .....4.10
So.Chicago,Ill. U5 ....4.10

Alloy Stand. Shapes
Clairton,Pa. U5 .....5.00
Fontana,Calif. K1 ....6.40
Gary,Ind. U5 .....5.00
Munhall,Pa. U5 .....5.00
So.Chicago,Ill. U5 .....5.00

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 .....6.175
Bessemer,Ala. T2 .....6.175
Bethlehem,Pa. B2 .....6.20
Clairton,Pa. U5 .....6.175
Fairfield,Ala. T2 .....6.175
Fontana,Calif. K1 ....6.825
Gary,Ind. U5 .....6.175
Geneva,Utah C11 .....6.175
Ind.Harbor,Ind. I-2 ..6.175
Ind.Harbor,Ind. Y1 ..6.675
Johnstown,Pa. B2 .....6.20
Lackawanna,N.Y. B2 ..6.20
LosAngeles B3 .....6.85
Munhall,Pa. U5 .....6.175
Seattle B3 .....8.90
So.Chicago,Ill. U5, W14 6.175
So.SanFrancisco B3 ....8.90
Struthers,O. Y1 .....6.675

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 .....6.20
Lackawanna,N.Y. B2 ..6.20
Munhall,Pa. U5 .....6.125
So.Chicago,Ill. U5 ....6.125

BEARING PILES
Munhall,Pa. U5 .....4.10
So.Chicago,Ill. U5 .....4.10

—PILING—

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ...4.925
Lackawanna,N.Y. B2 ..4.925
Munhall,Pa. U5 .....4.925
So.Chicago,Ill. U5 ....4.925

—PLATES—

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..4.10
Aliquippa,Pa. J5 .....4.10
Ashland,Ky. (15) A10 ..4.10
Bessemer,Ala. T2 .....4.10
Clairton,Pa. U5 .....4.10
Claymont,Del. C22 ....4.55
Cleveland J5, R2 .....4.10
Coatesville,Pa. L7 ....4.35
Conshohocken,Pa. A3 ..4.55
Ecorse,Mich. G5 .....4.65
Fairfield,Ala. T2 .....4.10
Fontana,Calif.(30) K1 ..4.75
Gary,Ind. U5 .....4.10
GraniteCity,Ill. G4 ....4.60
Geneva,Utah C11 .....4.10
Harrisburg,Pa. C5 ....6.50
Houston S5 .....4.60
Ind.Harbor,Ind. I-2, Y1.4.10
Johnstown,Pa. B2 .....4.10
Lackawanna,N.Y. B2 ..4.10
Minnequa,Colo. C10 ....4.95
Munhall,Pa. U5 .....4.10
Pittsburgh J5 .....4.10
Riverdale,Ill. A1 .....4.10
Seattle B3 .....5.00
Sharon,Pa. S3 .....4.10
So.Chicago,Ill. U5, W14 4.10
SparrowsPoint,Md. B2 ..4.10
Steubenville,O. W10 ...4.10
Warren,O. R2 .....4.10
Weirton,W.Va. W6 ....4.40
Youngstown R2, U5, Y1.4.10

PLATES, Carbon A.R.
Fontana,Calif. K1 .....5.90
Geneva,Utah C11 .....5.25

PLATES, Wrought Iron
Economy,Pa. B14 .....9.30

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 .....6.25
Bessemer,Ala. T2 .....6.25
Clairton,Pa. U5 .....6.25
Cleveland J5 .....6.25
Conshohocken,Pa. A3 ..6.50
Ecorse,Mich. G5 .....7.10
Fairfield,Ala. T2 .....6.25
Fontana,Calif.(30) K1 ..6.95
Gary,Ind. U5 .....6.25
Geneva,Utah C11 .....6.25
Ind.Harbor,Ind. I-2 ...6.25
Ind.Harbor,Ind. Y1 ....6.75
Johnstown,Pa. B2 .....6.25
Lackawanna,N.Y. B2 ..6.25
Munhall,Pa. U5 .....6.25
Pittsburgh J5 .....6.25
Seattle B3 .....7.15
Sharon,Pa. S3 .....6.25
So.Chicago,Ill. U5, W14 6.25
SparrowsPoint,Md. B2 ..6.25
Youngstown U5 .....6.25
Youngstown Y1 .....6.75

PLATES, Alloy
Claymont,Del. C22 ....5.65
Coatesville,Pa. L7 ....5.75
Fontana,Calif. K1 ....6.60
Gary,Ind. U5 .....5.55
Johnstown,Pa. B2 .....5.55
Munhall,Pa. U5 .....5.55
Sharon,Pa. S3 .....5.70
So.Chicago,Ill. U5, W14 5.55
SparrowsPoint,Md. B2 5.55

FLOOR PLATES
Cleveland J5 .....5.15
Conshohoken,Pa. A3 .5.15
Ind.Harbor,Ind. I-2 ....5.15
Munhall,Pa. U5 .....5.15
So.Chicago,Ill. U5 .....5.15

PLATES, Ingot Iron
Ashland,c.l (15) A10 ..4.35
Ashland,l.c.l. (15) A10..4.85
Cleveland, c.l. R2 .....4.70
Warren,O. c.l. R2 ....4.70

—BARS—

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 ..4.15
Aliquippa,Pa. J5 .....4.15
Alton,Ill. L1 .....4.50
Atlanta,Ga. A11 .....4.40
Bessemer,Ala. T2 .....4.15
Buffalo R2 .....4.15
Clairton,Pa. U5 .....4.15
Canton,O. R2 .....4.15
Cleveland R2 .....4.15
Detroit R7 .....4.30
Ecorse,Mich. G5 .....4.50
Emeryville,Calif. J7 ....4.90
Fairfield,Ala. T2 .....4.15
Fontana,Calif. K1 ....4.85
Gary,Ind. U5 .....4.15
Houston S5 .....4.65
Ind.Harbor,Ind. I-2, Y1.4.15
Johnstown,Pa. B2 .....4.15
KansasCity,Mo. S5 ....4.85
Lackawanna,N.Y. B2 ..4.15
LosAngeles B3 .....4.85
Milton,Pa. B6 .....4.55
Minnequa,Colo. C10 ....4.60
Niles,Calif. P1 .....4.85
N.Tonawanda,N.Y.B11 .4.15
Pittsburg,Calif. C11 ....4.85
Pittsburgh J5 .....4.15
Portland,Oreg. O4 ....4.90
Seattle B3, N14 .....4.90
So.Chicago R2, U5, W14 4.15
So.Duquesne,Pa. U5 ....4.15
So.SanFran.,Calif. B3...4.90
Sterling,Ill.(1) N15 ...4.15
Struthers,O. Y1 .....4.15
Torrance,Calif. C11 ....4.85
Weirton,W.Va. W6 ....4.30
Youngstown R2, U5 ....4.15

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ....4.875
Buffalo R2 .....4.875
Canton,O. T7 .....5.02
Canton,O. R2 .....4.875
Clairton,Pa. U5 .....4.875
Detroit R7 .....5.025
Ecorse,Mich. G5 .....5.225
Fontana,Calif. K1 ....5.925
Gary,Ind. U5 .....4.875
Houston S5 .....5.375
Ind.Harbor,Ind. I-2, Y1 4.875
Johnstown,Pa. B2 ....4.875
KansasCity,Mo. S5 ....5.575
Lackawanna,N.Y. B2..4.875
LosAngeles B3 .....5.925
Massillon,O. R2 .....4.875
Midland,Pa. C18 .....4.875
So.Chicago R2, U5,W14 4.875
So.Duquesne,Pa. U5 ..4.875
Struthers,O. Y1 .....4.875
Warren,O. C17 .....4.875
Youngstown U5 .....4.875

BARS & SMALL SHAPES, H.R.
High-Strength Low-Alloy
Aliquippa,Pa. J5 ....6.225
Bessemer,Ala. T2 ....6.225
Bethlehem,Pa. B2 ....6.225
Clairton,Pa. U5 .....6.225
Ecorse,Mich. G5 .....6.875
Fairfield,Ala. T2 .....6.225
Fontana,Calif. K1 ....7.475
Gary,Ind. U5 .....6.225
Ind.Harb.,Ind. I-2 ....6.225
Ind.Harb.,Ind. Y1 ....6.725
Johnstown,Pa. B2 .....6.225
Lackawanna,N.Y. B2 ..6.225
LosAngeles B3 .....6.925
Pittsburgh J5 .....6.225
Seattle B3 .....6.975
So.Chicago W14 .....6.225
So.Duquesne,Pa. U5 ..6.225
So.SanFrancisco B3 ..6.975
Struthers,O. Y1 .....6.725
Youngstown U5 .....6.225

BAR SIZE ANGLES;H.R.CARBON
Bethlehem,Pa. B2 .....4.35

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 .....4.15
Atlanta A11 .....4.40
Niles,Calif. P1 .....4.85
SanFrancisco S7 .....5.10

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 .....5.00
Fontana,Calif. K1 ....6.00
Gary,Ind. U5 .....5.00
Houston S5 .....5.70
KansasCity S5 .....5.90
Youngstown U5 .....5.00

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....5.20
BeaverFalls,Pa. M12, R2 5.20
Buffalo B5 .....5.25
Camden,N.J. P13 .....5.65
Caranegie,Pa. C12 ....5.20
Chicago W18 .....5.20
Cleveland A7, C20 ....5.20
Detroit P17, R7 .....5.35
Detroit B5 .....5.40
Donora,Pa. A7 .....5.20
Elyria,O. W8 .....5.20
FranklinPark,Ill. N5 ..5.20
Gary,Ind. R2 .....5.20
GreenBay,Wis. F7 ...5.185
Hammond,Ind. L2, M13 5.20
Hartford,Conn. R2 ....5.75
Harvey,Ill. B5 .....5.20
LosAngeles R2 .....6.65
Mansfield,Mass. B5 ....5.75
Massillon,O. R2, R8....5.20
Monaca,Pa. S17 .....5.20
Newark,N.J. W18 .....5.65
NewCastle,Pa. (17) B4. 5.20
Pittsburgh J5 .....5.20
Plymouth,Mich. P5 ....5.45
Putnam,Conn. W18 ....5.75
Readville,Mass. C14 ....5.75
St.Louis,Mo. M5 .....5.50
So.Chicago,Ill. W14 ....5.20
SpringCity,Pa. K3 ....5.65
Struthers,O. Y1 .....5.20
Waukegan,Ill. A7 .....5.20
Worcester,Mass. W19 ..6.10
Youngstown F3, Y1 ....5.20

BARS, Cold-Finished Carbon
(Turned and Ground)
Cumberland,Md.(5) C19.4.45

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....6.325
Beaver,Falls,Pa. M12 ..6.325
Bethlehem,Pa. B2 .....6.325
Buffalo B5 .....6.325
Camden,N.J. P13 .....6.50
Canton,O. R2 .....6.325
Canton,O. T7 .....6.29
Carnegie,Pa. C12 .....6.00
Chicago W18 .....6.325
Cleveland A7, C20 ....6.325
Detroit P17, R7 .....6.475
Detroit B5 .....6.525
Donora,Pa. A7 .....6.325
Elyria,O. W8 .....6.325
Gary,Ind. R2 .....6.325
Hammond,Ind. L2, M13 6.325
Hartford,Conn. R2 ....6.775
Harvey,Ill. B5 .....6.325
Lackawanna,N.Y. B2 ..6.325
Mansfield,Mass. B5 ....6.775
Massillon,O. R2, R8 ..6.325
Midland,Pa. C18 .....6.325
Monaca,Pa. S17 .....6.325
Newark,N.J. W18 .....6.65
Plymouth,Mich. P5 ....6.525
So.Chicago,Ill. R2, W14 6.325
SpringCity,Pa. K3 ....6.475
Struthers,O. Y1 .....6.325
Warren,O. C17 .....6.325
Waukegan,Ill. A7 .....6.325
Worcester,Mass. A7 ..6.625
Youngstown F3, Y1 ...6.325

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ..4.15
Atlanta A11 .....4.40
Buffalo R2 .....4.15
Cleveland R2 .....4.15
Emeryville,Calif. J7 ....4.90
Fairfield,Ala. T2 .....4.15
Fontana,Calif. K1 .....4.85
Gary,Ind. U5 .....4.15
Houston S5 .....4.65
Ind.Harbor,Ind. I-2, Y1.4.15
Johnstown,Pa. B2 .....4.15
KansasCity,Mo. S5 ....4.85
Lackawanna,N.Y. B2 ..4.15
LosAngeles B3 .....4.85
Milton,Pa. B6 .....4.55
Minnequa,Colo. C10 ....4.75
Niles,Calif. P1 .....4.85
Pittsburg,Calif. C11 ....4.85
Pittsburgh J5 .....4.15
SandSprings,Okla. S5 ..5.05
Seattle B3, N14 .....4.90
So.Chicago,Ill. R2 .....4.15
So.Duquesne,Pa. U5 ....4.15
So.SanFrancisco B3 ....4.90
SparrowsPoint,Md. B2 ..4.15
Sterling,Ill. (1) N15 ..4.15
Struthers,O. Y1 .....4.15
Torrance,Calif. C11 ....4.85
Youngstown R2, U5 ....4.15

BARS, Reinforcing
(Fabricated; to consumers)
Johnstown, ¾-1" B2 ..5.55
KansasCity S5 .....6.35
LosAngeles B3 .....6.18
Marion,O. P11 .....5.55
Seattle N14 .....5.80
Seattle B3 .....6.25
So.SanFrancisco B3 ....6.25
SparrowsPt, ⅜-1" B2..5.55
Williamsport,Pa. S19 ..5.45

RAIL STEEL BARS
Avis,Pa.(4) J8 .....4.75
ChicagoHts.(3) C2 ....4.50
ChicagoHts.(4) C2 ....4.75
ChicagoHts.(3,4) I-2 ...4.50
Franklin,Pa.(3) F5 ....4.50
Franklin,Pa.(4) F5 ....4.75
FortWorth,Tex.(26) T4..4.65
Marion,O.(3) P11 .....4.50
Moline,Ill.(3) R2 .....4.05
Tonawanda(3,4) B12 ..5.00
Williamsport(3) S19 ..5.25
Williamsport,Pa.(4) S19.5.45

BARS, Wrought Iron
Economy Pa.(S.R.) B14 10.40
Economy,Pa.(D.R.)B14 12.90
Economy(Staybolt) B14 13.20
Mck.Rks.(Staybolt) L5 15.50
Mck.Rks.(S.R.) L5 ...10.40
Mck.Rks.(D.R.) L5 ...14.00

—SHEETS—

SHEETS, Hot-Rolled Steel
(18 gage and heavier)
AlabamaCity,Ala. R2 .3.925
Ashland,Ky.(8) A10 ...3.925
Butler,Pa. A10 .....3.925
Cleveland J5, R2 ....3.925
Conshohocken,Pa. A3 ..4.325
Detroit M1 .....4.40
Ecorse,Mich. G5 .....4.125
Fairfield Ala. T2 .....3.925
Fairless,Pa. U5 .....4.025
Fontana,Calif. K1 .....4.70
Gary,Ind. U5 .....3.925
Geneva,Utah C11 ....4.025
GraniteCity,Ill. G4 ....4.30
Ind.Harbor,Ind. I-2, Y1 2.925
Irvin,Pa. U5 .....3.925
Lackawanna,N.Y. B2..3.925
Munhall,Pa. U5 .....3.925

Niles,O. N12 .....5.425
Pittsburg,Calif. C11 ..4.625
Pittsburgh J5 .....3.925
Riverdale,Ill. A1 .....3.925
Sharon, Pa. S3 .....4.225
So.Chicago,Ill. W14 ...3.925
SparrowsPoint,Md. B2..3.925
Steubenville,O. W10 ..3.925
Torrance, Calif. C11 ..4.625
Warren,O. R2 .....3.925
Weirton,W.Va. W6 ...3.925
Youngstown U5, Y1 ...3.925

SHEETS, H.R. (19 gage)

AlabamaCity,Ala. R2 ..5.225
Dover,O. R1 .....5.975
Mansfield,O. E6 .....5.80
Niles,O. N12 .....5.20
Torrance,Calif. C11 ...5.875

SHEETS, H.R. (14 ga. heavier) High-Strength Low-Alloy

Cleveland J5, R2 .....5.90
Conshohocken,Pa. A3 ..6.15
Ecorse,Mich. G5 .....6.375
Fairfield,Ala. T2 .....5.90
Fontana,Calif K1 .....7.00
Gary,Ind. U5 .....5.90
Ind.Harbor,Ind. I-2 ....5.90
Ind.Harbor,Ind. Y1 ....6.40
Irvin,Pa. U5 .....5.90
Lackawanna(35) B2 ...5.90
Munhall,Pa. U5 .....5.90
Pittsburgh J5 .....5.90
Sharon,Pa. S3 .....5.90
So.Chicago,Ill. U5 ....5.90
SparrowsPoint(38) B2 .5.90
Warren,O. R2 .....5.90
Weirton,W.Va. W6 ....6.175
Youngstown U5 .....5.90
Youngstown Y1 .....6.40

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ..4.175
Cleveland R2 .....4.525
Ind.Harbor,Ind. I-2 ..4.175
Warren,O. R2 .....4.525

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10 .....4.775
Cleveland J5, R2 .....4.775
Ecorse,Mich. G5 .....4.975
Fairfield,Ala. T2 .....4.775
Fairless,Pa. U5 .....4.875
Follansbee,W.Va. F4 ..5.775
Fontana,Calif. K1 ....5.875
Gary,Ind. U5 .....4.775
GraniteCity,Ill. G4 ....5.275
Ind.Harbor,Ind. I-2, Y1 4.775
Irvin,Pa. U5 .....4.775
Lackawanna,N.Y. B2 ..4.775
Middletown,O. A10 ....4.775
Pittsburg,Calif. C11 ..5.725
Pittsburgh J5 .....4.775
SparrowsPoint,Md. B2..4.775
Steubenville,O. W10 ...4.775
Warren,O. R2 .....4.775
Weirton,W.Va. W6 ....4.775
Youngstown Y1 .....4.775

SHEETS, Cold-Rolled High-Strength Low-Alloy

Cleveland J5, R2 .....7.225
Ecorse,Mich. G5 .....7.675
Fontana,Calif. K1 .....8.275
Gary,Ind. U5 .....7.225
IndianaHarbor,Ind. Y1 .7.725
Irvin,Pa. U5 .....7.225
Lackawanna(37) B2 ...7.225
Pittsburgh J5 .....7.225
SparrowsPoint (38) B2.7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ...7.475
Youngstown Y1 .....7.725

SHEETS, Cold-Rolled Ingot Iron

Butler,Pa. A10 .....5.275
Cleveland R2 .....5.375
Middletown,O. A10 ....5.275
Warren,O. R2 .....5.375

SHEETS, Gal'd No. 10 Steel

AlabamaCity,Ala. R2 ..5.275
Ashland,Ky (8) A10 ..5.275
Canton,O. R2 .....5.275
Dover,O. R1 .....5.675
Fairfield,Ala. T2 ....5.275†
Gary,Ind. U5 .....5.275†
GraniteCity,Ill. G4 ....5.475
Ind.Harbor,Ind. I-2 ..5.325
Irvin,Pa. U5 .....5.275†
Kokomo,Ind. C16 .....5.375
MartinsFerry,O. W10 ..5.275
Niles,O. N12 .....5.80
Pittsburg,Calif. C11 ...6.025†
Sharon,Pa. S3 .....5.45
SparrowsPoint,Md. B2 5.275
Steubenville,O. W10 ..5.275
Torrance,Calif. C11 ...6.275†
Weirton,W.Va. W6 ....5.275

†Based on 5c zinc.

SHEETS, Galvanized No. 10, High-Strength Low-Alloy

Irvin,Pa. U5 .....7.925
SparrowsPoint(39) B2 .8.075

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky.(8) A10 ..5.525
Canton,O. R2 .....6.025

SHEETS, Culvert

	Cu Alloy	Cu Fe
Ashland,Ky. A10	6.325	....
Canton,O. R2	...6.475	6.925
Fairfield T2	....6.075	6.325
Gary,Ind. U5	...6.075	6.325
Ind Harbor I-2	...6.075	6.325
Irvin,Pa. U5	...6.075	6.325
Kokomo,Ind. C16	6.525	....
MartinsFry.,O	W106.075	....
P itts Cal. C11	...6.825	....
SparrowsPt. B2	...6.075	....
Torrance,Calif.C11	6.825	....

SHEETS, Culvert Pure Iron

Ashland,Ky. A10 .....6.575
Fairfield,Ala. T2 .....6.325
MartinsFerry,O. W10 ..6.325

SHEETS, Galvannealed Steel

Canton,O. R2 .....5.825
Irvin,Pa. U5 .....5.825†
Kokomo,Ind.(13) C16 ..5.925
Niles,O. N12 .....6.35

†Based on 5c zinc.

SHEETS ZINCGRIP STEEL

Butler,Pa. A10 .....5.525
Middletown,O. A10 ....5.525

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10 .....5.775
Middletown,O. A10 ....5.775

SHEETS, Electro Galvanized

Cleveland R2 (28) 6.125
Niles,O. R2 (28) 6.125
Weirton,W.Va. W6 ....5.975

SHEETS, ALUMINIZED

Butler,Pa. A10 .....8.625

SHEETS, Enameling Iron

Ashland,Ky.(8) A10 ...5.175
Cleveland R2 .....5.175
Gary,Ind. U5 .....5.175
GraniteCity,Ill. G4 ....5.875
Ind.Harbor,Ind. I-2 ..5.175
Irvin,Pa. U5 .....5.175
Middletown,O. A10 ....5.175
Youngstown Y1 .....5.175

BLUED STOCK, 29 ga.

Yorkville,O. W10 .....7.20
Follansbee,W.Va. F4 ...7.30
Follansbee (23) F4 ...7.175

SHEETS, Long Terne Steel (Commercial Quality)

BeechBott'm.W.Va.W10 5.675
Gary,Ind. U5 .....5.675
Mansfield,O. E6 .....6.25
Middletown,O. A10 ....5.675
Niles,O. N12 .....6.00
Weirton,W.Va. W6 ....5.675

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....6.075

SHEETS, Well Casing

Fontana,Calif. K1 ....6.20

—STRIP—

STRIP, Hot-Rolled Carbon

Ala City,Ala.(24) R2 ..3.925
Alton,Ill. L1 .....4.20
Ashland,Ky.(8) A10 ...3.925
Atlanta A11 .....4.175
Bessemer,Ala. T2 ....3.925
Bridgeport,Con.(10)S15 4.425
Buffalo (27) R2 .....3.925
Butler,Pa.(8) A10 ...3.925
Carnegie,Pa. S18 ....4.425
Conshohocken,Pa. A3 .4.325
Detroit M1 .....4.40
Ecorse,Mich. G5 .....4.225
Fairfield,Ala T2 .....3.925
Fontana,Calif. K1 .....4.70
Gary,Ind. U5 .....3.925
Houston,Tex. S5 .....4.425
Ind.Harbor,Ind. I-2,Y1 3.925
Johnstown,Pa.(25) B2..3.925
KansasCity,Mo.(9) S5..4.625
Lackw'na,N.Y.(32) B2 3.925
LosAngeles(25) B3 ....4.675
Milton,Pa. B6 .....4.35
Minnequa,Colo. C10 ...5.025
NewBritain(10) S15 ...4.425
N.Tonawanda,N.Y. B11 3.925
Pittsburg,Calif. C11 ...4.675
Riverdale,Ill. A1 .....3.925
SanFrancisco S7 .....5.10
Seattle(25) B3 .....4.925
Seattle N14 .....4.925
Sharon,Pa. S3 .....4.225
So.Chicago,Ill. W14 ....3.925
So.SanFrancisco(25)B3 4.675
SparrowsPoint,Md. B2 .3.925
Torrance,Calif. C11 ...4.675
Warren,O. R2 .....3.925
Weirton,W.Va. W6 ....4.025
Youngstown Y1, U5 ...3.925

STRIP, Hot-Rolled Alloy

Bridgeport,Conn.(10)S15 6.45
Carnegie,Pa. S18 .....6.45
Fontana,Calif. K1 .....7.80
Gary,Ind. U5 .....6.40
Houston,Tex. S5 .....6.90
KansasCity,Mo. S5 ....7.10
LosAngeles B3 .....7.60
NewBritn.,Conn.(10)S15 6.45
Sharon,Pa. S3 .....6.45
So.Chicago W14 .....6.40
Youngstown U5 .....6.40

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2 ....5.65
Conshohocken,Pa. A3 ..6.20
Ecorse,Mich. G5 .....6.50
Fairfield,Ala. T2 .....5.65
Fontana,Calif. K1 .....7.05
Gary,Ind. U5 .....5.95
Ind.Harbor,Ind. I-2 ....5.95
Ind.Harbor,Ind. Y1 ....6.45
Lackawanna,N.Y. B2 ..6.00
LosAngeles(25) B3 ....6.40
Seattle(25) B3 .....6.65
Sharon,Pa. S3 .....5.95
So.SanFrancisco(25)B3 .6.40
SparrowsPoint,Md. B2 ..6.00
Warren,O. R2 .....5.95
Weirton,W.Va. W6 ....6.30
Youngstown Y1 .....6.45
Youngstown U5 .....5.95

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ...4.175
Warren,O. R2 .....4.525

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....5.80
Bridgeprt,Conn.(10) S15.6.15
Butler,Pa. A10 .....5.45
Cleveland A7, J5 .....5.45
Dearborn,Mich. D3 ....6.05
Detroit D2 .....5.95
Detroit M1 .....5.45
Dover,O. G6 .....5.80
Ecorse,Mich. G5 .....5.65
Follansbee,W.Va. F4 ...5.45
Fontana,Calif. K1 .....7.35
FranklinPark,Ill.(40) T6 .5.70
Ind.Harbor,Ind. I-2 ...5.70
Lackawanna,N.Y. B2 ...5.45
LosAngeles C1 .....7.50
Mattapan,Mass. T6 ....6.30
Middletown,O. A10 .....5.45
NewBritain(10) S15 ....6.15
NewCastle,Pa.(14) B4 ..5.45
NewCastle,Pa. E5 ....5.95
NewHaven,Conn. A7 ...5.95
NewHaven,Conn. D2 ...6.20
Pawtucket,R.I. R3 ....6.80
Pawtucket,R.I.(21) N8..6.65
Riverdale,Ill. (40) A1 ..5.70
Rome,N.Y.(29) R6 ....5.45
Sharon,Pa. S3 .....5.80
SparrowsPoint,Md. B2 ..5.45
Trenton,N.J. R5 .....7.00
Wall'ford,Conn. W2(50).6.40
Warren,O.(40) T5 .....5.95
Warren,O. R2 .....5.45
Weirton,W.Va. W6 ....5.45
Worcester,Mass. W19....7.05
Youngstown C8 .....5.95
Youngstown Y1 .....5.45

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn.(10)S15 12.15
Carnegie,Pa. S18 .....12.00
Cleveland A7 .....12.00
Dover,O. G6 .....12.00
Fontana,Calif. K1 ....13.65
Harrison,N.J. C18 ....12.00
NewBritn,Conn.(10)S15 12.15
Pawtucket,R.I.(11) N8..12.15
Pawtucket,R.I.(12) N8..12.45
Sharon,Pa. S3 .....12.00
Worcester,Mass. A7 ..12.30
Youngstown C8 .....12.00

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland J5 .....7.80
Cleveland A7 .....8.15
Dearborn,Mich. D3 ....7.90
Dover,O. G6 .....8.00
Ecorse,Mich. G5 .....8.50
Lackawanna,N.Y. B2 ...8.15
Sharon,Pa. S3 .....7.65
SparrowsPoint,Md. 8.15
Warren,O. R2 .....7.60
Weirton,W.Va. W6 ....8.30
Youngstown Y1 .....8.30

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....6.05

STRIP, Electro Galvanized

Dover,O. G6 .....5.70
Warren,O. T5 .....5.70
Weirton,W.Va. W6 ....5.45
Youngstown C8 .....5.95

TIGHT COOPERAGE HOOP

Atlanta A11 .....4.65
Riverdale,Ill. A1 .....4.50
Sharon,Pa. S3 .....4.55
Youngstown U5 .....4.35

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Bolardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B12 Buffalo Steel Div. H. K. Porter Co.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept., Wickwire Spencer Steel Division
C23 Charter Wire Products
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur D. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Co.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lake Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M16 Md. Fine & Special Wire
M17 Metal Forming Corp.

N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng.HighCarb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div.
N14 Nrthwst.Steel Roll. Mills
N15 Northwestern S.&W.Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.
R9 Rome Mfg. Co.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S25 StainlessWeldedProducts
S26 Specialty Wire Co. Inc.

T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div.,Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel
Y1 Youngstown Sheet&Tube

STRIP, Cold-Finished, Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Berea,O. C7	...	8.00	8.60	10.55	12.85
Bridgeport,Conn.(10) S15	6.15	8.00	8.60	10.55	12.85
Bristol,Conn. W1	...	...	8.90	10.85	....
Carnegie,Pa. S18	...	8.00	8.60	10.55	12.85
Cleveland A7	5.45	7.65	8.60	10.55	12.85
Dearborn,Mich. D3	6.05	8.25	8.85	....	....
Detroit D2	6.45	7.85	8.45	10.55	....
Dover,O. G6	6.05	8.00	8.60	10.55	12.85
FranklinPark,Ill. T6	5.80	7.80	8.75	10.70	....
Harrison,N.J. C18	....	...	8.90	10.85	13.15
Mattapan,Mass. T6	6.30	7.95	8.90	10.85	13.15
NewBritn., Conn.(10) S15	6.15	8.00	8.60	10.55	12.85
NewCastle,Pa. B4	5.80	8.00	8.60	....	....
NewCastle,Pa. E5	5.95	8.00	8.60	10.55	12.85
NewHaven,Conn. D2	6.70	7.95	8.55	10.50	....
NewYork W3	...	8.30	8.90	10.85	13.15
Pawtucket,R.I. N8:					
Cleve.orPitts.Base	....	...	8.00	8.60	10.55	12.85
Worcester,Mass.,Base	6.65	7.95	8.90	10.85	13.15
Sharon,Pa. S3	...	8.00	8.60	10.55	12.85
Trenton,N.J. R5	...	8.30	8.90	10.85	13.15
Wallingford,Conn. W2	6.65	7.95	8.90	10.85	13.15
Warren,O. T5	6.20	8.00	8.60	10.55	12.85
Weirton,W.Va. W6	5.80	8.00	8.60	10.55	12.85
Worcester,Mass. A7	5.75	7.95	8.90	10.85	13.15
Worcester,Mass. T6	6.30	7.95	8.90	10.85	13.15
Youngstown C8	...	8.00	8.60	10.55	12.85
Spring Steel (Tempered)					
Bristol,Conn. W1	...	...	...	12.50	15.00	....
FranklinPark,Ill. T6	...	...	...	12.50	15.00	18.00
Trenton,N.J. R5	...	...	...	12.50	15.00	18.00
Harrison,N.J. C18	...	...	...	12.50	15.00	18.00
NewYork W3	...	...	...	12.50	15.00	18.00
Worcester,Mass. T6	....	...	...	12.50	15.00	18.00
Youngstown C8	...	...	...	12.50	15.00	18.00

SILICON STEEL

SHEETS, SILICON, H.R. or C.R.(22 Ga.) COILS (cut lengths ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom W10 (cut lengths)	...	...	8.35	9.60	10.40
Brackenridge,Pa. A4	...	...	8.85	10.10	10.90
GraniteCity,Ill. G4 (cut lengths)	...	...	8.55	9.80	...
IndianaHarbor,Ind. I-2	8.05	8.35	8.85	(34)	...
Mansfield,O. E6 (cut lengths)	7.55	7.85	8.35	9.60	10.40
Newport,Ky. N9 (cut lengths)	...	7.85	8.35	9.60	10.40
Niles,O. N12 (cut lengths)	7.55	7.85	8.35	...	...
Vandergrift,Pa. U5	...	8.35	8.85	10.10	10.90
Warren,O. R2	8.05	8.35	8.85	10.10	10.90
Zanesville,O. A10	...	8.35	8.85	10.10	10.90

SHEETS, SILICON (22 Ga. Base) COILS (Cut Lengths ½c lower)	Transformer Grade 72	65	58	52
BeechBottom W10 (cut lengths)	10.95	11.50	12.20	13.00
Brackenridge,Pa. A4	11.45	....	....	....
Newport,Ky. N9 (cut lengths)	10.95	....	....	....
Vandergrift,Pa. U5	11.45	12.00	12.70	13.50
Warren,O. R2	11.45	....	....	....
Zanesville,O. A10	11.45	12.00	12.70	13.50

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)	....	....	16.05	16.55
Vandegrift, Pa. U5	14.00	14.85	15.85	16.35

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.40	$7.65	$8.05
Fairfield,Ala. T2	7.50	7.75	8.15
Fairless,Pa. U5	7.50	7.75	8.15
Gary,Ind. U5	7.40	7.65	8.05
GraniteCity,Ill. G4	7.60	7.85	8.25
IndianaHarbor,Ind. I-2, Y1	7.40	7.65	8.05
Irvin,Pa. U5	7.40	7.65	8.05
Niles,O. R2	7.40	...	...
Pittsburg,Calif. C11	8.15	8.40	8.80
SparrowsPoint,Md. B2	7.50	7.75	8.15
Weirton,W.Va. W6	7.40	7.65	8.05
Yorkville,O. W10	7.40	7.65	8.05

TIN PLATE, American 1.25 Coke (Base Box)	lb	1.50 lb
Aliquippa,Pa. J5	$8.70	$8.95
Fairfield,Ala. T2	8.80	9.05
Fairless,Pa. U5	8.80	9.05
Gary,Ind. U5	8.70	8.95
Ind Har. I-2, Y1	8.70	8.95
Irvin,Pa. U5	8.70	8.95
Pitts.,Cal. C11	9.45	9.70
Sp.Pt.,Md. B2	8.80	9.05
Warren,O. R2	8.70	
Weirton,W.Va.W6	8.70	8.95
Yorkville,O. W10	8.70	8.95

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$6.50
Fairfield,Ala. T2	6.60
Fairless,Pa. U5	6.60
Gary,Ind. U5	6.50
GraniteCity,Ill. G4	6.70
Ind.Harbor,Ind. I-2,Y1	6.50
Irvin,Pa. U5	6.50
Niles,O. R2	6.50
Pittsburg,Calif. C11	7.25
SparrowsPoint,Md. B2	6.60
Warren,O. R2	6.50
Weirton,W.Va. W6	6.50
Yorkville,O. W10	6.50

HOLLOWARE ENAMELING Black Plate (29 gage)	
Follansbee,W.Va. F4	6.10
Gary,Ind. U5	6.10
GraniteCity,Ill. G4	6.30
Ind.Harbor,Ind. Y1	6.10
Irvin,Pa. U5	6.10
Yorkville,O. W10	6.55

MANUFACTURING TERNES (Special Coated)	
Fairfield,Ala. T2	$7.85
Gary,Ind. U5	7.75
Irvin,Pa. U5	7.75
Yorkville,O. W10	7.75

MANUFACTURING TERNES, 8 lb (Commercial Quality)	
Gary,Ind. U5	$9.75
Yorkville,O. W10	9.75

MANUFACTURING TERNES, LT. Coated, 6 lb	
Yorkville,O. W10	$8.65

ROOFING SHORT TERNES (8 lb Coated)	
Gary,Ind. U5	9.75

—WIRE—

WIRE, Manufacturers Bright, Low Carbon	
AlabamaCity,Ala. R2	5.525
Aliquippa,Pa. J5	5.525
Atlanta A11	5.775
Alton,Ill. L1	5.75
Bartonville,Ill. K4	5.625
Buffalo W12	5.525
Chicago W13	5.525
Cleveland A7, C20	5.525
Crawfordsville,Ind. M8	5.625
Donora,Pa. A7	5.525
Duluth,Minn. A7	5.525
Fairfield,Ala. T2	5.525
Fostoria,O. (24) S1	6.02
Houston S5	5.925
Johnstown,Pa. B2	5.525
Joliet,Ill. A7	5.525
KansasCity,Mo. S5	6.125
Kokomo,Ind. C16	5.625
LosAngeles B3	6.475
Minnequa,Colo. C10	5.775
Monessen,Pa. P7	5.525
No.Tonawanda B11	5.525
Palmer,Mass. W12	5.825
Pittsburg,Calif. C11	6.475
Portsmouth,O. P12	5.725
Rankin,Pa. A7	5.525
So.Chicago,Ill. R2	5.525
So SanFrancisco C10	6.475
SparrowsPoint,Md. B2	5.625
Sterling,Ill. (1) N15	5.525
Struthers,O. Y1	5.525
Torrance,Calif. C11	6.475
Waukegan,Ill. A7	5.525
Worcester,Mass. A7	5.825

WIRE, MB Spring, High Carbon	
Aliquippa,Pa. J5	6.925
Alton,Ill. L1	7.15
Bartonville,Ill. K4	7.025
Buffalo W12	6.925
Cleveland A7	6.925
Donora,Pa. A7	6.925
Duluth,Minn. A7	6.925
Fostoria,O. S1	6.925
Johnstown,Pa B2	6.925
Milbury (12) N6	8.725
Minnequa,Colo. C10	7.175
Monessen,Pa. P7	6.925
Monessen,Pa. P16	6.95
Muncie,Ind. I-7	7.125
Palmer,Mass. W12	7.225
Pittsburg,Calif. C11	7.875
Roebling,N.J. R5	7.225
Portsmouth,O. P12	6.925
So.Chicago,Ill. R2	6.925
So.SanFran. C10	7.875
SparrowsPt.,Md. B2	7.025
Struthers,O. Y1	6.925
Trenton,N.J. A7	7.225
Waukegan,Ill. A7	6.925
Worcester A7, J4	7.225
Worcester T6, W12	7.225

WIRE, Upholstery Spring	
Aliquippa,Pa. J5	6.625
Alton,Ill. L1	6.85
Buffalo W12	6.625
Cleveland A7	6.625
Donora,Pa. A7	6.625
Duluth,Minn. A7	6.625
Johnstown,Pa. B2	6.625
LosAngeles B3	7.575
Minnequa,Colo. C10	6.875
Monessen,Pa. P7	6.625
Monessen,Pa. P16	6.625
NewHaven,Conn. A7	6.925
Palmer,Mass. W12	6.925
Pittsburg,Calif. C11	7.375
Portsmouth,O. P12	6.625
Roebling,N.J. R5	6.925
So. Chicago,Ill. R2	6.625
So. SanFrancisco C10	7.375
SparrowsPoint,Md. B2	6.725
Torrance,Calif. C11	7.575
Trenton,N.J. A7	6.925
Waukegan,Ill. A7	6.625
Worcester,Mass. A7	6.925

WIRE, Fine & Weaving (8"Coils)	
Alton,Ill. L1	10.75
Bartonville,Ill. K4	10.65
Buffalo W12	10.55
Chicago W13	10.55
Cleveland A7	10.55
Crawf'sville,Ind. M8	10.55
Fostoria,O. S1	10.55
Johnstown,Pa. B2 (43)	8.90
Kokomo,Ind. C16	10.55
Monessen,Pa. P16	10.55
Muncie,Ind. I-7	10.75
Palmer,Mass. W12	10.85
Roebling,N.J. R5	10.85
So.SanFrancisco C10	10.90
Waukegan,Ill. A7	10.55
Worcester,Mass. A7,T6	10.85

WIRE, Galv'd ACSR for Cores	
Bartonville,Ill. K4	9.50
Johnstown,Pa. B2	9.50
Monessen,Pa. P16	9.50
Muncie,Ind. I-7	9.70
Roebling,N.J. R5	9.80
SparrowsPt.,Md. B2	9.60

ROPE WIRE	(A)
Alton,Ill. L1	9.45
Bartonville,Ill. K4	9.35
Buffalo W12	9.35
Fostoria,O. S1	9.35
Johnstown,Pa. B2	9.35
Monessen,Pa. P7, P16	9.35
Muncie,Ind I-7	9.55
Palmer,Mass. W12	9.65
Portsmouth,O. P12	9.35
Roebling,N.J. R5	9.65
SparrowsPt., B2	9.45
Struthers,O. Y1	9.35
Worcester J4, T6	9.65

(A) Plow and Mild Plow; add 0.25c for improved plow.

WIRE, Tire Bead	
Alton,Ill. L1	12.75
Bartonville,Ill. K4	12.65
Monessen,Pa. P16	12.00
Roebling,N.J. R5	12.85

WIRE, Cold-Rolled Flat	
Anderson,Ind. G6	7.45
Buffalo W12	7.45
Cleveland A7	7.45
Craf'sville,Ind. M8	7.55
Dover,O. G6	7.45
Fostoria,O. S1	7.45
Kokomo,Ind. C16	7.55
FranklinPark,Ill. T6	7.60
Massillon,O. R8	7.45
Monessen,Pa. P16	8.00
Monessen,Pa. P7	7.45
Pawtkt.R.I.(12) N8	7.75
Trenton,N.J. R5	7.75
Worcester A7, T6 W12	7.75

WIRE, Merchant Quality (6 to 8 gage)	An'ld. Galv.
AlabamaCity R2	6.675 7.075
Aliquippa J5	6.675 7.20*
Atlanta A11	6.925 7.475
Bartonville(19)K4	6.675 7.225
Buffalo W12	6.675 7.075
Cleveland A7	6.675
CrawfordsvilleM8	6.775 7.325
Donora,Pa. A7	6.675 7.075†
Duluth,Minn. A7	6.675 7.075†
Fairfield T2	6.675 7.075†
Houston,Tex. S5	7.075 7.475
JohnstownB2(48)	6.675 7.225
Joliet,Ill. A7	6.675 7.075†
KansasCity,Mo.S5	7.275 7.675
Kokomo C16	6.775 7.175
LosAngeles B3	7.625
Minnequa C10	6.925 7.325**
Monessen P7(48)	6.675 7.225
Palmer W12	6.975 7.375
Pitts.Calif. C11	7.625 8.025†
Prtsmth A7 (18)P12	6.575
Rankin A7	6.675 7.075†
So.Chicago R2	6.075 6.325
So.S'an Fr.(48) C10	7.625 8.025**
Spar'wsPt. B2(48)	6.775 7.325
Sterl'g(1)(48)N15	6.675 7.225
Struthers,O. Y1	6.675 7.175
Worcester A7	6.975

*Based on 10c zinc; †5c zinc; **Subject to zinc equalization extras.

WIRE (16 gage)	An'ld. Galv. Stone	Stone
Aliquippa J5	10.63	12.72*
Bartonville(19)K4	10.73	12.51
Cleveland A7	12.50	....
Crawfordville M8	12.50	14.35
Fostoria,O. S1	12.60	14.15
Johnstown B2	12.50	14.35
Kokomo C16	12.60	14.15
Min'qua C10	12.75	14.45**
Palmer,Mass.W12	12.50	14.05
Pitts.Calif. C11	12.85	14.40†
SparrowsPt. B2	12.60	14.45
Sterling(1) N15	10.73	12.15
Waukegan A7	12.50	14.05†
Worcester A7	12.80	....

*Based on 11c zinc; †5c zinc; **Subject to zinc equalization extras.

WIRE, Barbed	Col.
AlabamaCity,Ala. R2	153
Aliquippa J5	150*
Atlanta A11	159
Bartonville,Ill.(19) K4	156
Crawfordsville,Ind. M8	159
Donora,Pa. A7	153†
Duluth,Minn. A7	153†
Fairfield,Ala. T2	153†
Houston,Tex. S5	161
Johnstown,Pa. B2	156
Joliet Ill. A7	153
KansasCity,Mo. S5	165
Kokomo,Ind. C16	155
Minnequa,Colo. C10	159**
Monessen,Pa. P7	157
Pittsburg,Calif. C11	173†
Rankin,Pa. A7	153†
So.Chicago,Ill. R2	153
S.SanFrancisco C10	173**
SparrowsPoint,Md. B2	158
Sterling,Ill.(1) N15	156

†Based on 5c zinc; *11c zinc; **Subject to zinc equalization extras.

WOVEN FENCE, 9-15½ Ga. Col.	
AlabamaCity,Ala. R2	140
Ala.City,Ala.17 ga. R2	235
Ala.City,Ala.18 ga. R2	245
Aliqp'pa,Pa.9-14½ga.J5	143*
Atlanta A11	146
Bartonville,Ill.(19) K4	143
Crawfordsville,Ind. M8	145
Donora,Pa. A7	140†
Duluth,Minn. A7	140†
Fairfield,Ala. T2	140†
Houston,Tex. S5	148
Johnstown,Pa. B2	143
Johnstown 17ga.,6" B2	234
Johnstown, 4"	237
Joliet,Ill. A7	140†
KansasCity,Mo. S5	152
Kokomo,Ind. C16	142
Minnequa,Colo. C10	148**
Monessen,Pa. 9 ga. P7	145
Pittsburg,Calif. C11	163†
Rankin,Pa. A7	140†
So.Chicago,Ill. R2	140
Sterling,Ill. (1) N15	143

†Based on 5c zinc; *11c zinc; **Subject to zinc equalization extras.

BALE TIES, Single Loop	Col.
AlabamaCity,Ala. R2	149
Atlanta A11	152
Bartonville,Ill.(19) K4	149
Crawfordsville,Ind. M8	151
Donora,Pa. A7	149
Duluth,Minn. A7	149
Fairfield,Ala. T2	149
Joliet,Ill. A7	149
KansasCity,Mo. S5	161
Kokomo,Ind. C16	151
Minnequa,Colo. C10	154
Pittsburg,Calif. C11	173
So.Chicago,Ill. R2	149
So.SanFran.,Calif. C10	173
SparrowsPoint,Md. B2	151
Sterling,Ill.(1) N15	149

NAILS, Stock To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	131
Aliquippa,Pa. J5	131
Atlanta A11	134
Bartonville,Ill. (19) K4	131
Chicago,Ill. W13	131
Cleveland A9	131
Crawfordsville,Ind. M8	133
Donora,Pa. A7	131
Duluth,Minn. A7	131
Fairfield,Ala. T2	131
Galveston,Tex. D7	139
Houston,Tex. S5	139
Johnstown,Pa. B2	131
Joliet,Ill. A7	131
KansasCity,Mo. S5	143
Kokomo,Ind. C16	133
Minnequa,Colo. C10	136
Monessen,Pa. P7	131
Pittsburg,Calif. C11	150
Portsmouth,O. P12	132
Rankin,Pa. A7	131
So.Chicago,Ill. R2	131
SparrowsPt.,Md. B2	133
Sterling,Ill. (1) N15	131
Worcester,Mass. A7	137

NAILS, Cut (100 lb keg) to dealers (33)	
Conshohocken,Pa. A3	$8.00
Wheeling,W.Va. W10	8.00

STAPLES, Polished, Stock To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	131
Aliquippa,Pa. J5	133
Atlanta A11	136
Bartonville,Ill. (19) K4	133
Crawfordsville,Ind. M8	135
Donora,Pa. A7	133
Duluth,Minn. A7	133
Fairfield,Ala. T2	133
Johnstown,Pa. B2	133
Joliet,Ill. A7	133
Kokomo,Ind. C16	135
Minnequa,Colo. C10	138
Monessen,Pa. P7	133
Pittsburg,Calif. C11	152
Portsmouth,O. P12	132
Rankin,Pa. A7	133
So.Chicago,Ill. R2	131
SparrowsPt.,Md. B2	135
Sterling,Ill. (1) N15	133
Worcester,Mass. A7	139

—FENCE POSTS—

	Col.
ChicagoHts.,Ill. C2, I-2	145
Duluth,Minn. A7 (49)	143
Franklin,Pa. F5	145
Johnstown,Pa. B2	145
Marion,O. P11	145
Minnequa,Colo. C10	150
Moline,Ill. R2	145
So.Chicago,Ill. R2	145
Tonawanda,N.Y. B12	148
Williamsport,Pa. S19	158

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (‡)	15.75	list	19.75	2.5	22.25	5	23.75	6.5	23.75	6.5	23	5.75	25.5	8.25
Ambridge, Pa. N2 (†)	18.25	...	22.25	...	24.75	...	26.25	...	26.25	...	26.00	...	28.50	...
Lorain, O. N3 (*)	15.75	4.5	19.75	5.5	22.25	8	23.75	9.5	23.75	9.50	23	8.75	25.5	11.25
Youngstown Y1 (††)	15.75	list	19.75	2.50	22.25	5.00	23.75	6.50	23.75	6.50	23.00	5.75	25.50	8.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2 (††)	15.75	list	19.75	2.5	22.25	5.0	23.75	6.5	23.75	6.5	23.0	5.75	25.5	8.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼		1½	
List Per Ft	5.5c		6c		8.5c		11.5c		17c		23c		27.5c			
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28		2.73	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv.
Aliquippa, Pa. J5 (‡)	...	...	...	...	...	...	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5
Alton, Ill. L1 (§)	...	...	...	...	...	...	23.25	7	26.25	11	28.75	14.5	31.25	15.5	31.75	16.5
Benwood, W. Va. W10(††)	25.5	+0.75	17.75	+6	10.25	+10.75	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5
Butler, Pa. F6 (†)	26.5	+2.75	19.5	+7.25	12.5	+13	...	..	...	..	...	...	...	...	...	...
Etna, Pa. N2 (†)	28	+1.25	22	+4.75	16	+9.5	28.75	9.5	31.75	13.5	34.25	17	36.75	18.75	37.25	19.75
Fontana, Calif. K1 (††)	...	...	...	...	...	...	13.25	+3	16.25	1	18.75	4.5	21.25	5.5	21.75	6.5
Ind. Harbor Y1 (††)	...	...	...	...	...	...	25.25	9	28.25	13	30.75	16.5	33.25	17.5	33.75	18.5
Lorain, O. N3 (*)	...	...	...	...	...	...	26.25	16	29.25	20	31.75	23.5	34.25	23	34.75	24
Sharon, Pa. S4 (†)	26.5	—0.25	19.5	+4.25	12.5	+8.5	...	..	...	..	...	...	...	...	...	...
Sharon, Pa. M6	...	...	...	...	...	...	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5
Sparrows Pt., Md. B2 (§)	24.5	+1.75	17.5	+6.25	10.5	+10.5	24.25	8	27.25	12	29.75	15.5	32.25	16.5	32.75	17.5
Youngstown R2 (††)	...	...	...	...	...	...	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5
Youngstown Y1 (††)	...	...	...	...	...	...	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5
Wheatland, Pa. W9 (§)	24.5	+1.75	17.5	+6.25	10.5	+10.5	26.25	10	29.25	14	31.75	17.50	34.25	18.50	34.75	19.50

Size—Inches	2		2½		3		3½		4	
List Per Ft.	37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft.	3.68		5.82		7.62		9.20		10.89	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (‡)	35.25	20	36.75	20	36.75	20	....	....	....	....
Alton, Ill. L1 (§)	32.25	17	33.75	17	33.75	17	....	....	....	....
Benwood, W.Va. W10(††)	35.25	20	36.75	20	36.75	20	27.75	10.5	27.75	10.5
Etna, Pa. N2 (†)	37.75	20.25	39.25	21	39.25	21	30.25	11.5	30.25	11.5
Fontana, Calif. K1 (††)	22.25	7	23.75	7	23.75	7	....	....	....	....
Ind. Harbor, Ind. Y1 (††)	34.25	19	35.75	19	35.75	19	....	....	....	....
Lorain, O. N3 (*)	35.25	24.5	36.75	23	36.75	23	....	....	....	....
Sharon, Pa. M6	35.25	20	36.75	20	36.75	20	....	....	....	....
Sparrows Pt., Md. B2 (§)	32.25	18	34.75	18	34.75	18	25.75	8.5	25.75	8.5
Youngstown R2 (††)	35.25	20	36.75	20	36.75	20	27.75	10.5	27.75	10.5
Youngstown Y1 (††)	35.25	20	36.75	20	36.75	20	....	....	....	....
Wheatland, Pa. W9 (‡)	35.25	20	36.75	20	36.75	20	....	....	....	....

Galvanized pipe discounts based on zinc price of: (†), 14c; (‡), 11c to under 12c; (*), 5c; (§), 11.00c; (††), 10.50c-11.50c; with discounts adjusted on price of zinc at time of shipment.

BOILER TUBES

Net base c.l prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	21.31	18.44
1¼	13	....	25.24	18.12
1½	13	23.12	27.89	20.01
1¾	13	26.84	32.37	23.66
2	13	30.08	36.28	26.51
2¼	13	34.18	41.23	29.86
2¼	12	37.10	44.75	32.41
2½	12	40.51	48.86	35.70
2¾	12	43.85	52.90	38.66
3	12	45.92	55.39	41.23

RAILWAY MATERIALS

RAILS	Std. No. 1	Std. No. 2	Std. All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	4.325	4.225	4.275	5.20
Ensley,Ala. T2	4.325	4.225	....	5.20
Fairfield,Ala. T2	....	....	....	5.20
Gary,Ind. U5	4.325	4.225	4.275	...
Huntington,W.Va. W7	....	....	....	5.20
Indiana Harbor,Ind. I-2	4.325	4.225	4.275	...
Johnstown,Pa. B2	....	....	....(16)	5.20
Lackawanna,N.Y. B2	4.325	4.225	....	5.20
Minnequa,Colo. C10	4.325	4.125	....	5.70
Steelton,Pa. B2	4.325	4.225	....	...
Williamsport,Pa. S19	....	....	....	5.20

TIE PLATES

Fairfield,Ala. T2 .....5.125
Gary,Ind. U5 .....5.125
Ind.Harbor,Ind I-2 ....5.125
Lackawanna,N.Y. B2 ..5.125
Minnequa,Colo. C10 ..5.125
Pittsburg,Calif. C11 ..5.275
Seattle B3 .....5.275
Steelton,Pa. B2 .....5.125
Torrance,Calif. C11 ....5.275

TRACK BOLTS (20) Treated

KansasCity,Mo. S5 ....11.00
Lebanon,Pa. (31) B2 ..10.75
Minnequa,Colo. C10 ...11.00
Pittsburgh O3, P14 ..11.00

JOINT BARS

Bessemer,Pa. U5 ....5.275
Fairfield,Ala. T2 .....5.275
Ind.Harbor,Ind. I-2 ..5.275
Joliet,Ill. U5 .....5.275
Lackawanna,N.Y. B2 ..5.275
Minnequa,Colo. C10 ...5.275
Steelton,Pa. B2 .....5.275

AXLES

Ind.Harbor,Ind. S13 ..6.50
Johnstown,Pa. B2 .....6.50

STANDARD TRACK SPIKES

Ind.Harbor,Ind. I-2, Y1.7.05
KansasCity,Mo. S5 ....7.30
Lebanon,Pa. B2 .....7.05
Minnequa,Colo C10 ....7.05
Pittsburgh J5 .....7.05
Seattle B3 .....7.55
So.Chicago,Ill. R2 .....7.05
Struthers,O. Y1 .....7.05
Youngstown R2 .....7.05

RIVETS

F.o.b. Cleveland, and/or freight equalized with Pittsburgh; f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in.,larger 8.90c
⅞-in. under .....26.5 off

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants, per cent off list for less than case lots to consumers)

6 in. and shorter:
½-in & smaller diam. 4
⅝-in. & ⅞-in. 5
1-in. and larger .. 3
Longer than 6 in.:
All diams. ..... +4
Lag bolts, all diams.:
6 in. and shorter.... 12
over 6 in. long 8
Ribbed Nec .d Carriage 5
Blank 25
Plow 25
Step, Elevator, Tap and Sleigh Shoe 12
Tire Bolts ..... List
Boiler & Fitting-Up Bolts 23

NUTS

H.P. & C.P., regular & heavy:
Square, all sizes 58
H.P., Hex, regular & heavy:
¾" and smaller 58
⅞" to 1¼", inclusive 60
1⅛" to 1½", inclusive 62
1⅝" and larger 58
C.P. Hex, regular heavy:
All sizes 58
Hot Galv. Nuts (all types):
¾" and smaller 40
⅞" to 1½", inclusive 43
Finished Hex Nuts:
New standard, all sizes 58
Semifinished & Slotted Hex:
Regular and heavy, all sizes 58

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam x 6 in. and shorter 34
1 in. and smalled diam. x over 6 in. 20

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller ... 34
¼-in. diam & larger .. 14
N.F. thread, all diams.. 8

STEEL STOVE BOLTS

(F.o.b. plant, per cent off list in packages)

Plain finish .....47.5 & 10
Plated finishes .....30 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:
⅝-in. & smaller .. 38
⅞-in. through 1 in. .. 22
Longer than 6 in.:
⅝-in. and smaller .. 20
⅞-in. through 1 in.. 2

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

	Cents
Sponge iron: 98+ % Fe, annealed	18.00
Unannealed	14.50
Swedish, c.l.f. N.Y., c.l., in bags	11.25
Electrolytic iron: Annealed, 99.5% Fe.	42.50
Unannealed (99+ % Fe)	36.50
Unannealed (99+ % Fe) (minus 325 mesh)	53.50
Powder Flakes	48.50
Carbonyl Iron: 97.9-99.8% size 5 to 10 microns.	.83.00-148.00
Aluminum: Carlots, freight allowed	31.00
Atomized, 500 lb drums, freight allowed	34.00
Antimony, 500 lb lots.	78.00
Brass, 20-ton lots	29.50-36.50
Bronze, 10-ton lots	.51.00-60.00
Copper: Electrolytic	43.25
Reduced	43.25
Lead	21.75
Magnesium	.75.00-85.00
Manganese: Minus 100 mesh	57.00
Minus 35 mesh	52.00
Minus 200 mesh	62.00
Nickel unannealed	89.50
Nickel-Silver 5-ton lots	47.00
Silicon	38.50
Solder	8.50*
Stainless Steel, 302	91.00
Tin	14.00*
Zinc, 10-ton lots	.17.50-25.00
Tungsten Melting grade, 99% 60 to 200 mesh:	Dollars
1000 lb and over	5.35
Less than 1000 lb	5.50
Chromium, electrolytic 99.9% Cr min.	3.50

* Plus cost of metal.

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1¼" to 1 7/16"; 1 7/16" to 1 15/16" 4.58c; 1 15/16" to 7 5/16" 4.95c.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ½" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25c off for uncreated.
(21) New Haven, Conn., base.
(22) Del. San Francisco Bay area.
(23) 20 Ga. 36" wide.
(24) Deduct 0.20c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing mill lengths, to fabricators; to consumers, 5.40c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; add 0.35c for universal mill.
(31) Not annealed.
(32) Rd. or square edge.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 gage & lighter; 69" & narrower.
(38) 14 gage & lighter; 48" and narrower.
(39) 48" and narrower.
(40) Lighter than 0.025"; 0.025" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Plus 0.375c per 100 lb.
(43) Plus 4.7% on base and extras.
(48) 6.7 gage.
(49) U-post; add 2 cols. for T-post.
(50) 0.025 gage; 6.55c for 0.026 to 0.068 gage; 6.65c for 0.069 gage and over.

STAINLESS STEEL MILL PRICES

(Representative prices, cents per pound; subject to current lists of extras)

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	H.R. Strip	Shapes; H.R. & C.F. Bars; Wire	Plates	Sheets	C.R. Strip; Flat Wire
301	16.25	20.50	29.50	34.25	29.75	35.25	37.25	46.25	38.25
302	17.25	22.75	29.75	34.50	32.00	35.50	37.50	46.50	41.50
302B	18.50	24.50	30.50	34.50	35.00	35.50	37.50	48.75	44.75
303	18.75	24.75	32.25	37.25	36.75	38.25	39.75	48.75	45.50
304	18.25	23.75	31.00	36.00	34.25	37.25	39.75	48.75	43.75
306	19.50	25.50	....	36.25	37.00	37.50	42.00	51.75	46.75
308	19.75	26.25	35.25	40.75	38.00	42.00	46.00	55.25	48.00
309	26.50	34.75	43.25	49.25	49.25	50.50	53.75	63.50	62.00
309S	28.50	37.50	47.50	54.50	54.00	55.50	59.00	68.50	68.50
310	33.00	43.25	56.75	66.25	67.50	67.50	69.00	72.25	78.75
314	....	....	....	....	....	....	69.00	74.50	....
316	28.00	36.25	46.75	54.50	55.00	55.50	59.00	64.50	66.50
317	33.00	43.50	58.25	66.75	67.50	68.25	70.75	77.00	79.25
318	33.50	44.00	55.25	64.50	66.25	65.50	68.75	78.00	80.25
321	22.75	29.50	35.25	40.75	42.00	42.00	46.00	55.50	54.50
330	....	....	....	58.00	....	....	68.50	70.00	73.75	77.75
347	24.50	32.25	39.50	45.75	46.50	46.75	51.25	60.75	59.25
403	....	....	....	27.00	30.75	....	32.00	34.25	44.00	41.25
405	16.50	21.75	25.25	29.25	30.50	30.25	31.75	42.50	39.75
410	14.00	18.25	24.00	27.75	26.25	28.75	30.00	40.75	34.25
416	....	....	....	24.50	28.25	....	29.25	30.50	41.25	41.25
420	22.00	28.50	29.25	34.00	35.50	35.00	38.50	49.25	52.75
430	14.25	18.50	24.50	28.25	27.00	29.25	30.50	43.50	34.75
430F	....	18.75	25.00	28.75	....	29.75	31.00	44.00	44.00
431	14.50	28.50	25.00	28.25	27.50	29.25	30.50	44.00	35.25
440A,B,C	....	28.50	29.25	34.00	....	35.00	38.50	49.25	52.75
442	....	....	....	28.00	....	....	30.50	35.25	48.25	47.75
446	....	....	....	33.75	38.25	53.00	39.50	40.75	59.75	71.00
501	....	....	....	14.00	14.50	21.25	16.00	18.25	30.50	29.00
502	....	....	....	15.25	16.00	22.25	17.00	20.00	31.75	30.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Division, U. S. Steel Corp.; Armco Steel Corp.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur D. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Co.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Division, Borg Warner Corp.; Jessop Steel Co.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; Page Steel & Wire Division, American Chain & Cable Co. Inc.; Republic Steel Corp.; Rome Mfg. Co.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Stainless Welded Products Inc.; Superior Steel Corp.; Timken Roller Bearing Co.; Tube Methods Inc.; United States Steel Corp. ; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

CLAD STEEL

Cladding Stainless	Plates—Carbon Base 10%	Plates—Carbon Base 20%	Sheets—Carbon Base 20%	Sheets—Copper Base Both Sides
302	.....	31.00	31.00	77.00
304	27.60	32.50-32.70	32.50	77.00
310	36.50	41.00	.....	144.00
316	32.60	37.70-42.75	42.75	....
318	37.00	42.20	.....	....
321	29.30	34.40-37.00	37.00	111.00
347	30.40	35.50-40.50	40.50	130.00
405	23.40	30.60	.....	....
410	22.90	30.10	.....	....
430	22.90	30.10	.....	....
Inconel	41.23	54.18	.....	165.00
Nickel	37.50	50.90	.....	....
Monel	38.90	51.80	.....	....
Copper*	....	.....	46.00	....

	Strip, Carbon Base—Cold-Rolled 10%	Strip, Carbon Base—Cold-Rolled Both Sides	Strip, Carbon Base—Hot-Rolled 10%	Strip, Carbon Base—Hot-Rolled Both Sides
Copper*	27.85	35.85	24.00	32.25

* Deoxidized. Production points: Stainless sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont Del. C22 Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates Coatesville L7; copper-clad strip, Carnegie, Pa. S18. Production point for copper-base sheets is Carnegie, Pa. A13.

TOOL STEEL

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.25-.285	5% Cr Hot Work	0.39
Extra Carbon	0.33-.340	W-Cr Hot Work	0.41
Special Carbon	0.35-.360	V-Cr Hot Work	0.43
Oil Hardening	0.370-.39	Hi-Carbon-Cr.	0.665-.70

Grade by Analysis (%) W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	...	4.055
18.25	4.25	1	4.75	...	2.340
18	4	2	9	...	2.565-2.695
18	4	2	...	...	1.820
18	4	1	...	...	1.580-1.660
13.5	4	3	...	...	1.875
6.4	4.5	1.9	...	5	1.065
6	4	3	...	6	1.300
2	1.4	1.2	...	...	0.495
1.5	4	1	...	8.5	0.895

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V3.

PIG IRON, Gross Ton

F.o.b. furnace prices as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem,Pa. B2	$58.00	$58.50	$59.00	$59.50
New York, del.	....	62.28	62.78	....
Newark, del.	61.02	61.52	62.02	62.52
Philadelphia, del.	60.75	61.25	61.75	62.25
Birmingham District				
AlabamaCity,Ala. R2	52.38	52.88	....	....
Birmingham R2	52.38	52.88	....	....
Birmingham U6	....	52.88	....	....
Woodward,Ala. W15	52.38	52.88	....	....
Cincinnati, del.	....	60.43	....	....
Buffalo District				
Buffalo R2, H1	56.00	56.50	57.00	....
Tonawanda,N.Y. W12	56.00	56.50	57.00	....
No. Tonawanda,N.Y. T9	....	56.50	57.00	....
Boston, del.	66.65	67.15	67.65	....
Rochester,N.Y., del.	59.02	59.52	60.02	....
Syracuse,N.Y., del.	60.12	60.62	61.12	....
Chicago District				
Chicago I-3	56.00	56.50	56.50	57.00
Gary,Ind U5	56.00	....	56.50	....
IndianaHarbor,Ind. I-2	56.00	....	56.50	....
So.Chicago,Ill. W14, Y1	56.00	56.50	56.50	....
So.Chicago,Ill. U5	56.00	....	56.50	57.00
Milwaukee, del.	58.17	58.67	58.67	59.17
Muskegon,Mich., del.	....	62.80	62.80	....
Cleveland District				
Cleveland A7	56.00	56.50	56.50	57.00
Cleveland R2	56.00	56.50	56.50	....
Akron,O., del. from Cleve.	58.75	59.25	59.25	59.75
Lorain,O. N3	56.00	....	....	57.00
Pittsburgh District				
Nevillelsland,Pa. P6	56.00	56.50	56.50	....
Pitts.,N.&S. sides, Ambridge, Aliquippa, del.	57.37	57.87	57.87	....
McKeesRocks, del.	57.04	57.54	57.54	....
Lawrenceville, Homestead, Wilmerding, Monaca, del.	57.66	58.16	58.16	....
Verona, Trafford, del.	58.19	58.69	58.69	....
Brackenridge, del.	58.45	58.95	58.95	....
Bessemer,Pa. U5	56.00	....	56.50	57.00
Clairton,Rankin,So.Duquesne,Pa. U5	56.00	....	....	....
McKeesport,Pa. N3	56.00	....	....	57.00
Midland,Pa. C18	56.00	....	....	....
Monessen,Pa. P7	56.00	....	....	....
Youngstown District				
Hubbard,O. Y1	....	....	56.50	....
Youngstown Y1	....	....	56.50	57.00
Youngstown U5	56.00	....	....	57.00
Mansfield,O., del.	60.90	....	61.40	61.90
Duluth I-3	56.00	56.50	56.50	57.00
Erie,Pa. I-3	56.00	56.50	56.50	57.00
Everett,Mass. E1	....	63.25	63.75	....
Fontana,Calif. K1	62.00	62.50	....	....
Geneva,Utah C11	57.50	58.00	....	....
GraniteCity,Ill. G4	57.90	58.40	58.90	....
Ironton,Utah C11	56.00	56.50	....	....
LoneStar,Texas L6	52.00	52.50*	52.50	....
Minnequa,Colo. C10	58.00	59.00	59.00	....
Rockwood,Tenn. T3	....	....	58.50	....
Sharpsville,Pa. S6	56.00	56.50	56.50	57.00
Steelton,Pa. B2	58.00	58.50	59.00	59.50
Swedeland,Pa. A3	60.00	60.50	61.00	61.50
Toledo,O. I-3	56.00	56.50	56.50	57.00
Cincinnati, del.	61.76	62.26	....	....
Troy,N.Y. R2	58.00	58.50	59.00	....

*Low phos. southern grade.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.0-6.50% silicon; add $1.50 for each 0.5% Si; 75 cents for each 0.5% Mn over 1%)

Jackson,O. G2, J1	$67.00
Buffalo H1	68.25

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.45 for each 0.5% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	$91.00
Keokuk,Iowa, Openhearth & Fdry, freight allowed K2	95.50
Keokuk, OH & Fdry, 12½ lb piglets, 16% Si, frt. allowed K2	98.50
Wenatchee,Wash., OH & Fdry, freight allowed K2	95.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$61.00
Rockwood,Tenn. T3	68.50
Steelton,Pa. B2	64.00
Philadelphia, delivered	67.56
Troy,N.Y. R2	64.00

Here's one you'll want to bite on! It's Formbrite

FISH find this particular line of brass spinners so attractive that fishermen's demands have built annual sales of the Aeroplane Tackle Manufacturing Company of Denver to more than two million lures of all types.

The high finish on the spinner is part of the secret. While the cost of producing this is of no interest to the fish, it is to the manufacturer. Recently all brass orders were changed to Formbrite*, the superior ANACONDA Drawing Brass that has enabled this firm to cut polishing costs over 25%, and on several stamped products to produce the required finish by tumbling only prior to lacquering or plating.

Formbrite, with its superfine grain, provides a surface far superior to ordinary drawing brass. It is stronger, harder, more scratch-resistant than ordinary brass, yet retains remarkable ductility for forming and drawing. It's a premium product at a non-premium price. If these features lure you, we should like to show you how this better brass can cut your product's finishing costs. Or write for Publication B-39 to *The American Brass Company, General Offices, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Limited, New Toronto, Ontario.*

Upper lure is Formbrite. Lower one is made of ANACONDA Fancy Pattern Embossed Brass.

Thirty-five years ago a fisherman, disgusted with his luck, cut up an old brass bait box to make himself a spinner resembling an old-time airplane propeller. Both fish and fisherman liked it so much, he started what is now a big and thriving business. *Reg. U.S. Pat. Off. 5592

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WAREHOUSE STEEL PRODUCTS

(Representative prices, cents per pound, subject to extras, f.o.b. warehouse. City delivery charges are 20 cents per 100 lb except: New York, 30 cents; Philadelphia, 25 cents; Birmingham, Cincinnati, San Francisco, St. Paul, 15 cents.)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot Rolled	Cold Rolled	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.‡	H.R. Alloy 4140††§		Carbon	Floor
Baltimore	6.20	7.64	7.81	7.00	...	6.86	8.17[6]	12.04	6.98	6.85	7.98
Birmingham	6.10	7.00	8.00[2]	6.30	...	6.15	8.90	....	6.35	6.35	8.65
Boston	6.89	7.83	9.23	7.13	...	6.87	8.35	12.28	7.06	7.13	8.26
Buffalo	6.18	7.15	9.01	6.79	...	6.35	7.70	12.17	6.59	6.68	7.88
Charlotte, N. C.	6.95	7.80	8.69	6.90	...	7.10	8.37	....	7.10	7.10	8.37
Chicago	6.18	7.12	8.05	6.42	...	6.28	7.30	11.75	6.46	6.33	7.46
Cincinnati	6.51	7.19	8.47	6.72	...	6.58	7.66	12.17	6.93	6.85	7.88
Cleveland	6.18	7.12	7.90	6.58	...	6.34	7.65	11.89	6.79	6.50	7.79
Detroit	6.45	7.32	8.34	6.71	...	6.57	7.60	11.92	6.93	6.85	7.80
Houston	7.15	7.85	9.32	7.45	...	7.45	...	....	7.35	7.20	8.55
Jersey City, N.J.	6.54	7.45	8.72	6.82	...	6.75	8.43[6]	11.84	6.50	6.67	8.01
Los Angeles	7.25	9.00	9.35	7.55	11.20	7.15	9.10	13.05	7.35	7.20	9.25
Milwaukee	6.35	7.29	8.22	6.59	...	6.45	7.57	11.92	6.63	6.50	7.63
Moline, Ill.	6.53	7.47	8.40	6.77	...	6.63	7.65	....	6.81	6.68	...
New York	6.54	7.45	8.72	6.82	...	6.75	8.43[6]	11.84	6.50	6.67	8.01
Newark, N. J.	6.78	7.75	9.02	7.16	...	7.06	8.43[6]	....	6.90	6.99	8.30
Norfolk, Va.	6.90	...	...	7.20	...	7.20	8.50	....	7.20	7.15	7.85
Philadelphia	6.53	7.55	8.35	7.02	8.80	6.87	8.19[6]	11.89	6.67	6.63	7.65
Pittsburgh	6.18	7.12	8.30	6.55	...	6.28	7.65	11.89	6.46	6.33	7.46
Portland, Oreg.	7.90	9.30	10.00	7.90	...	7.60	10.90	....	7.50	7.55	9.40
Richmond, Va.	6.50	7.45	8.00	7.10	...	7.05	7.95	....	7.10	6.85	8.10
St. Louis	6.48	7.42	8.35	6.72	...	6.58	7.70	12.05	6.86	6.73	7.86
St. Paul	6.84	7.78	8.71	7.08	...	6.94	8.06	....	7.12	6.99	8.12
San Francisco	7.35	8.70	10.15	7.60	...	7.15	9.75	13.05	7.25	7.20	9.25
Seattle	8.15	8.70	10.10	8.02	...	7.58	10.13	13.50	7.50	7.59	9.40
Spokane	8.15	9.25[7]	10.10	8.50	...	7.60	11.00[8]	14.15	7.25	7.35	9.80
Washington	6.71	8.15	8.35	7.51	...	7.37	8.43	....	7.49	7.36	8.49

*Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gages extra excluded); ‡ includes 35-cent special bar quality extra; § as rolled; †† as annealed; ** ¼" and heavier, 8.09c for No. 12 and lighter. Base quantities, 2000 to 9999 lb except as noted. Cold-rolled strip, 2000 lb and over; Cold-finished bars, 2000 lb and over; [2]—500 to 9999 lb; [6]—1000 to 1999 lb; [7]—1000 lb and over; [7]—1500 lb to 3499; [8]—under ½ in.

Warehouse Steel Stocks Climbing Steadily

Inventories in some districts rise to level of 70 to 75 per cent normal, but generally are unbalanced. Turnover maintains satisfactory pace with pickup expected after Labor Day

New York—Predicated on less cold-rolled sheet tonnage going to the automobile industry, including producers of components, warehouses look for an improved supply in fourth quarter. Most distributors could take in substantial shipments of cold-rolled sheets before getting stocks of that commodity into balance. Over-all warehouse stocks have been built up to 70 to 75 per cent normal, but there are still shortages in some products, including wide flanged beams, rounds and heavy flats. Alloy and specialty inventories are sufficient to meet heavier demand after Labor Day, also butt weld pipe on which some price shading is appearing.

Philadelphia—While steel distributors' August business will be off from that for July, in line with the usual seasonal trend, the drop will be relatively small; sales generally will be satisfactory. Demand for plates, shapes and hot and cold sheets has remained brisk throughout the month. While there has been some let-up in bars, especially in the smaller sizes of hot and cold carbon and in most sizes of alloy bars, over-all volume is good. Meanwhile, inventories are getting in better balance on most items.

Boston — As distributors' inventories improve, tight spots are confined to larger sizes of products in ample supply in smaller ranges. These include heavy plates, large rounds, wide flanged beams and cold-rolled sheets. Shortages in the latter will be wiped out shortly as mills are offering and distributors are buying wanted gages. Over-all warehouse inventories have been built up to about 70 per cent normal, but are still unbalanced as to sizes and products mentioned. Volume held by warehouses is slightly higher, but full rebound from the summer slump is not expected until sometime in September.

Birmingham — Warehouse steel is still in short supply. One of the district's largest steel warehouses is taking whatever foreign steel it can get. Distributors' shipments are as regular as short stocks and complete absence of some of the items will permit.

Pittsburgh—Brisk activity noted in warehouses here earlier this month has quieted down. Business now is steady and substantial. Demand is still heavy for sheet and for all structurals.

Some slackening is taking place in cold-finished bars, with spotty declines reported in hot-rolled bars and plate.

Los Angeles—Warehouse sales are spotty and are 15 per cent less than the peaks reached in April—May. All signs point to even softer demand. Fabricators are rejecting material, not buying except for current needs, demanding more service, and generally adopting a coy air in steel buying. Distributors expect a sharper downward trend; it's only a question of when, they say.

Seattle—Warehouse price schedules are firm and unchanged. July and August volume shows a drop, but distributors expect better business in September. Scarce items show no improvement. Plates, hot and cold-rolled sheets are in poor supply and no relief is in sight during the balance of the year. Galvanized sheets are plentiful; bars and wire products, in good supply. Inventories continue unbalanced.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 104

Seattle—Aside from 1000 tons for a Columbia basin pumping plant project, no large reinforcing contracts are pending. Mills continue on full operating schedules. Inquiries are slowing and competition for new business is keener. Considerable volume in small tonnages is reported.

Sheet Supply Improves for Fourth Quarter

Consumers expect to cover their more important needs fully for that period and believe a balance between supply and demand is rapidly approaching. Demand continues active

Sheet and Strip Prices, Page 104 & 105

Philadelphia—Sheet supply is loosening up a bit for fourth quarter, but consumers in this district are taking all the extra tonnage offered.

Freer supply of enameling stock reflects easier conditions in other areas than locally, for all the bonus tonnage offered around here is quickly absorbed by manufacturers of bath tubs, commercial refrigerators, air conditioning and agricultural equipment, and other light metal fabricators. Stovemakers are not quite so pressing in their requirements, although there are a couple who are willing to take all the extra tonnage they can get.

What is true of enameling stock as to local demand is even still more true of the more important grades, namely hot and cold sheets, especially the latter. Although these grades are not required in the same volume as enameling stock for some products, they are needed in far larger volume, if not exclusively, for others. Galvanized sheet demand recently expanded, but is now lagging again, with the notable exception of needs for air conditioning and agricultural equipment.

New York—While the immediate scramble for sheets—hot and cold-finished—is strong, there is slightly less concern among consumers regarding fourth quarter supply. Some buyers figure that, whether they get all the tonnage they desire or not, they will fare better than they are doing in the current quarter and that the odds are largely in favor of getting their more important needs fulfilled. In other words, they believe that balance between supply and demand is fast approaching. There are still a number, however, who are not hesitating to commit themselves for as much tonnage, particularly in cold sheets, as the mills appear willing to offer—just providing they do not have to pay premiums above the general mill average and do not have to absorb too much freight. In addition to major hot and cold grades, enameling stock and electrical sheets are still in active demand, all of which adds to the conviction that the pressure for consumer durables has not as yet run its full course. Galvanized sheets are not in as relatively active demand as the above mentioned grades. Yet one large eastern producer says that he is still able to move the capacity output of his mills.

Chicago — So far sheetmakers haven't had their order picture altered noticeably by the fire at the Livonia, Mich., automatic transmission plant of General Motors Corp. Outright cancellations of sheets have been negligible, but there have been some minor deferments in shipments requested. In addition, some parts suppliers have indicated their requirements will not be as great as originally contemplated. However, mills report demand for both cold-rolled and hot-rolled sheets is very strong and they have a place to ship every ton released.

Boston—Cold-rolled silicon sheets, in coils especially, is one flat-rolled product not expected to ease in fourth quarter. Other grades, including cold-rolled sheets, are offered in higher volume, but consumers, realizing they are again in the driver's seat, are not rushing in to buy. The expected is taking place with decline in automotive demand—more sheets for other users. Selective selling on part of some mills is disappearing.

Narrow cold strip schedules are filled beyond sheets for fourth quarter, but some scattered cancellations and deferments are appearing. Procurement on monthly basis, rather than quarterly, is growing with consumers ordering nearer to lead time limit.

Cincinnati—There seems to be a minor readjustment under way in the sheet market. Mills express no doubt that there will be a lower level of production. The largest mill in this area reports no cancellations but rather a pushing back of orders. This pushing back is of a limited magnitude in this one mill because of its broad diversification. Other mills which concentrate solely on cold-rolled products have been harder hit. This readjustment still leaves substantial orders in the fourth quarter.

Worcester, Mass. — Worcester Pressed Steel Co. is again offering cold-rolled strip and bars on the open market. Low carbon strip is available in thicknesses ranging from 0.125 in. to 0.375 in. and in widths up to 13 in. Cold-finished bars are available in thicknesses from 0.187 in. to 0.375 in. and in widths of 2 in. to 13 in.

The company's base price on cold-rolled strip is 7.05c a pound; on cold-finished bars, 6.10c.

Until the start of World War II, Worcester Pressed Steel Co. served New England fabricators as a ma-

Preformed Panels Gain Wider Acceptance

Use of Tri-Rib steel deck panels, manufactured by Wheeling Corrugating Co., Wheeling, W. Va., is increasing steadily. The company claims it permits savings of up to 20 per cent in steel required for structural members, such as columns, beams, purlins. Preformed to exact radius of roof curvature, each panel fits snugly and, as shown above, is welded to every structural member it crosses

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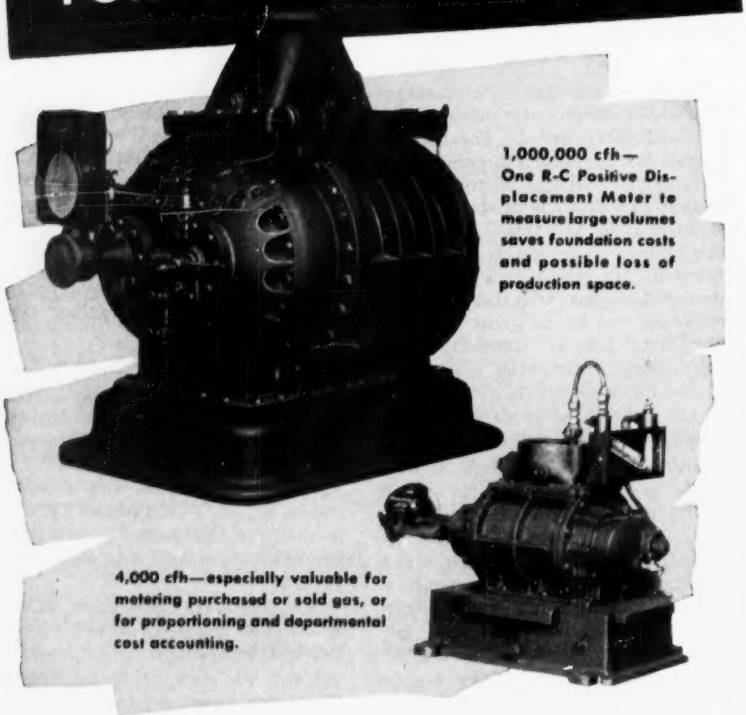

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jor source of supply for cold-rolled strip steel and cold-finished bars. Because of shortages of basic materials and a sharp increase in demand for steel for its own stamping plant, the company discontinued its role as a cold-rolled steel supplier. After World War II the company's facilities were devoted chiefly to rerolling of steel for customers. Now that steel is in easier supply, the company is re-entering the open market.

Pittsburgh—Little loosening is expected in sheet supply until the middle of the fourth quarter. Users of hot and cold-rolled sheet can't fill all needs, although a small appliance-maker reports the metal is easier to obtain now than it was this summer.

Any declines in the fourth quarter from automakers are expected to be compensated for by model changes early next year.

Los Angeles—Outlook for supplies of flat-rolled products from Kaiser Steel Corp.'s Fontana Works is not encouraging. In anticipation of a softening of the market, due to reduced auto requirements, Kaiser accepted more tonnage than rolling capacity could handle comfortably. The demand for sheet and plate is deeper and stronger than Kaiser figured; cancellations, which had been expected to adjust for the overbooking, haven't materialized.

Structural Shapes . . .

Structural Shape Prices, Page 104

Pittsburgh—Structural shapes are among the items hardest to obtain in this area. Producers point to future road building projects as indications that demand will be heavy well into 1954.

Warehousemen report they are often unable to stock more than 50 per cent of their normal allotment of structural shapes. One said he was "nearly out of business in wide flange beams," the tightest of the shapes.

Boston—Relocation of route 5 in the Springfield, Mass., area, including bridge over Westfield river, will require 3000 additional tons, the bridge project closing Sept. 15. Volume being estimated is not large and district shops are not now adding to backlogs. For girder fabrication, plates are in better supply, but wide flanged beams are difficult to obtain. Larger fabricating shops are quoting February-March delivery on bridge work.

New York—Commercial and industrial construction is stepping up a bit, but the major portion of work being figured is still bridge construction. A leading inquiry involves 2750 tons of state thruway work in Herk-

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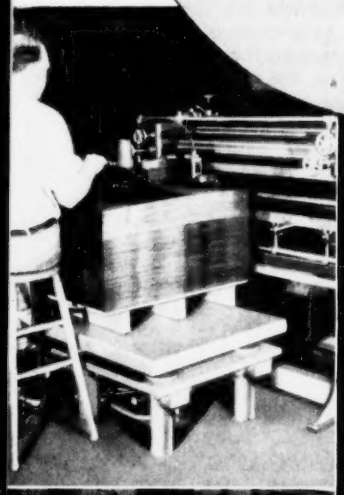

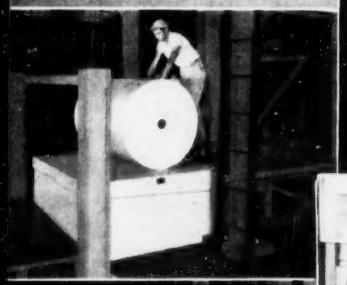

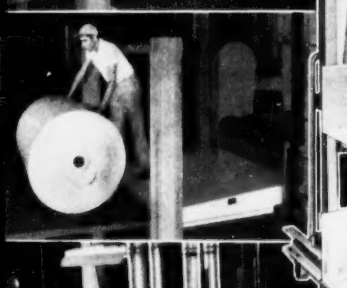

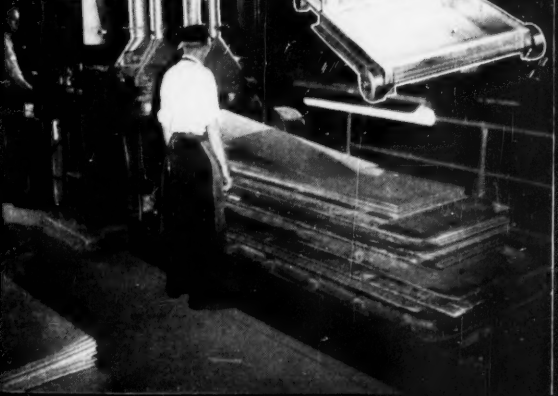

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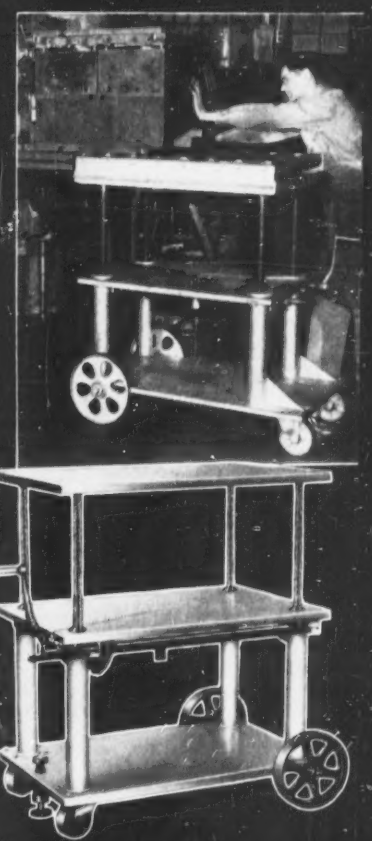

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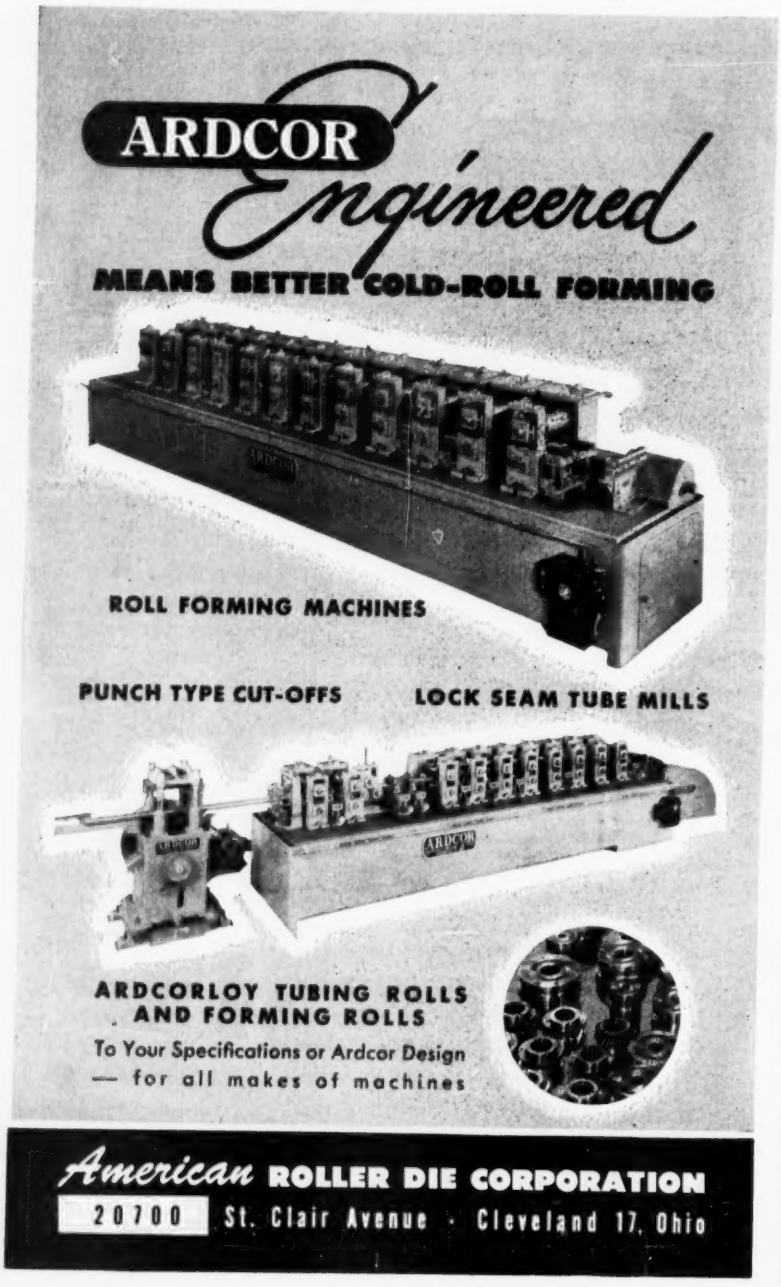
imer county, New York, while an outstanding award involves 2851 tons for New York state thruway work in Monroe county. Smaller fabricators appear to be getting a better break with a stepping up in the number of small jobs being reported here.

Philadelphia—Wide flange beams continue in tight supply with no material easing in prospect even by the end of this year. But supply and demand for standard shapes show indications of some balance by that time. Meanwhile, structural activity is still dominated by bridgework, with plans expected out around the middle of September for a large tonnage for the superstructure of the Philadelphia-Gloucester bridge over the Delaware for the Delaware River Port Authority.

Seattle — Pacific Car & Foundry Co., Seattle, has taken 3500 tons involved in gates, guides and other items for The Dalles, Oreg., powerhouse.

Considerable tonnage is pending, including 3000 tons for Mountain Home base, Idaho; 2500 tons for Fairchild air base, Washington; and 3500 tons for a Columbia river bridge in Umatilla county, Washington, in addition to a number of smaller projects. Warehouses and other Alaska military installations are up for early bidding.

Plant backlogs are fair, but some sales managers are eagerly seeking new business.



Semifinished Steel . . .

Semifinished Prices, Page 104

Los Angeles—Ingot capacity engaged by seven major Western mills producing 64 per cent of all far western-made steel fell below 100 per cent of theoretical capacity for the first time since the strike, down 4 per cent on the average. Trade observers suspect that these western mills are "throttling back" the pace of steelmaking in anticipation of a softness in the demand for finished steel. Supplying of conversion slabs to customers for rolling at the Geneva plant of Columbia-Geneva Division, U. S. Steel Corp., enabled Kaiser Steel Corp.'s Fontana Works to maintain and even increase its operating rate to 125 per cent and to sustain the composite Western operating rate at 102.5 per cent.

Steel Bars . . .

Bar Prices, Page 104

Boston—While hot-rolled bar schedules generally are filled through the year, there is less snap to buying. Some old overdue unshipped bar orders have been canceled. This is an inventory move. Users do not want this tonnage coming in on top of orders since placed. There are openings for November in cold-finished bars. Converters are building some stocks and, while taking in hot-rolled allotments, are releasing orders more cautiously. Alloy volume is off. Military cutbacks have hurt alloys more than carbon grades.

New York — Despite some spot openings and a greater d'sposition on the part of buyers not to commit themselves too far ahead, the hot carbon bar market continues fundamentally strong. Such spot tonnages as are developing are quickly snapped up in other quarters and producers anticipate good shipments in the fourth quarter, even though they may be off some from the current quarter. Actually, there is greater expectation of balance between supply and demand by the end of the year, but producers are confident that even this will mean good business. Some cold drawers report that recently there has been a little acceleration in cold carbon demand,

involving sizes 1 in. and larger. They don't anticipate a full order book for fourth quarter, but they believe a full order book is nevertheless in the making, particularly on these larger sizes. Alloy bars, both hot and cold, remain in rather sluggish demand.

Philadelphia—Hot carbon bars producers generally are sold out for October. Those who have opened their books for beyond that month say customers have indicated they will take full allotments offered. However, producers will not know for sure how general this will be until the monthly lead-time approaches and all consumers are forced to act one way or the other. Most sellers, though, feel confident enough business will be placed over the remaining months of the year to keep them busy.

Pittsburgh—Declines in orders are appearing on a small scale in cold-finished bars. These are now easier to obtain, especially in smaller sizes.

Demand remains strong for high quality bars. A producer states that no drops in alloy bar orders have occurred yet as result of the recent General Motors Corp.'s transmission plant fire.

Chicago—The easing in demand for large diameter bars continues. It seems to be a result of a combination of reduced requirements from users, rather than a reduction in any specific field. Perhaps the easing in production of ammunition is cutting the biggest figure. An assist also is being given by slower demand from heavy machinery lines.

Los Angeles — Bar demand has sagged across the board. Rounds are easing in the smaller range, and somewhat softer in sizes over 2 in. One barmaker has cut back production in anticipation of even more widespread lessening of demand. Bar purchases of aircraft subcontractors is off.

Wire . . .

Wire Prices, Page 106

Boston—Users of cold heading wire, including screw manufacturers, have cut back on that grade and are placing tonnage to specification. Upholstery spring wire is also slower. With spots for October still open on some types of wire, it is clear most consumers are correcting inventory and are in no hurry to place forward volume. Competitively, wire selling is back to normal with indications November orders will be heavier than those in October, although actual orders coming in for that month are slow.

Specialties excepted, nonintegrated producers are becoming loaded up on rods.

Plates . . .

Plate Prices, Page 104

Chicago — Plate fabricators feel their prospects for getting more tonnage in fourth quarter are good but there is almost no step-up so far. Unlike some lighter industries which see lower operations in last period of the year as a distinct possibility, the heavy industry considers the orders on books as unlikely to suffer by cancellation. Thus, an increase in steel supply will expedite shop scheduling of work.

New York—While the major pressure in plates is on the heavier gages, there is still a strong demand for 3/16 through 3/8 in. material. District tank shops are confronted with an active demand and have not as yet been able to get their inventories in balance. To date there has been little in the way of spot openings and, while this may come, it would seem at the moment that platemakers are not going to have difficulty in disposing of the great bulk of

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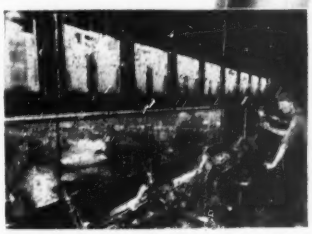

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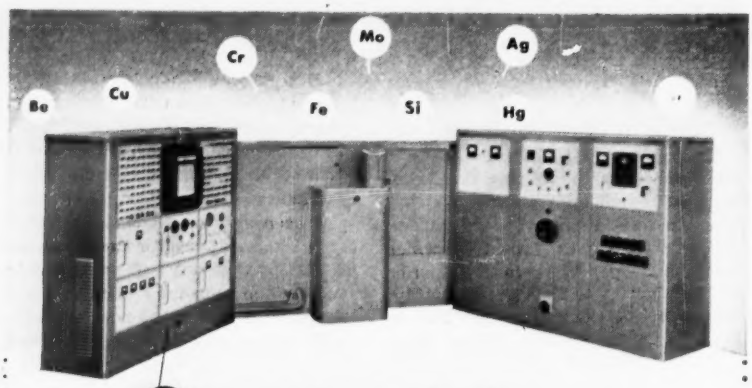

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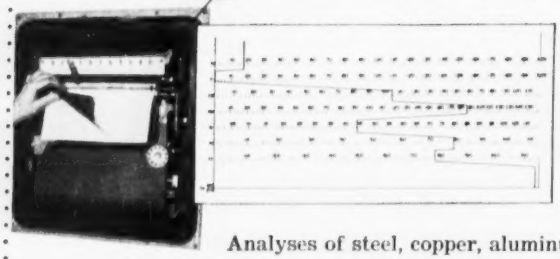

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their fourth quarter output. About the only line that is lagging here is ship work and so far plate sellers have had no trouble filling up that gap.

Boston—Plate mills are filled as far into fourth quarter as they will accept orders. This means November. Others are booked through the year. Heavy and wide plates are in limited supply and many can not order specifications wanted in sheared plates. Tank shop inventories are slightly improved and consumers of universal plates are not too badly pinched. Floor plates are in ample supply. Most tonnage is sold through warehouses now holding substantial stocks.

Philadelphia—Not much is heard of spot openings in plates. In ship work, there has been a steady decline in requirements, but no sudden cutbacks. Plate demand for pipe fabrication and building construction has been relatively steady and on an over-all basis, along with tanks and boiler requirements, actually heavier than supply. Railroad car needs, while far from heavy compared with those for some recent years, also are steady. Shrinkage in strip-plate production, now that government regulations are off and strip producers are at liberty to devote more capacity to strip, has added to the general stringency in plates.

Pittsburgh—A supply-demand balance in plate is still weeks away, as many fabricators can't get all they need.

Spottiness is developing in orders, despite the strong over-all demand. Railroad car buying has been slow. Slight softening in orders from automakers is taking place; generally, there is less urgency in the clamor for plate.

Seattle—Demand for plates continues brisk. The supply situation is no better and a market for Japanese steel in this area remains open.

Interest centers in the proposed oil pipe line from tidewater at Haines, Alaska, to Fairbanks. Bids for this $40-million project are expected to be invited in November by U. S. Engineers; quantities are unstated.

Several thousand tons are involved in several military installations both in Alaska and the Pacific Northwest, awards expected in the near future, bids in.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 127

Chicago—Foundry coke continues to be an easy item. Demand is substantially below ability to produce it, but the excess is not noticeable

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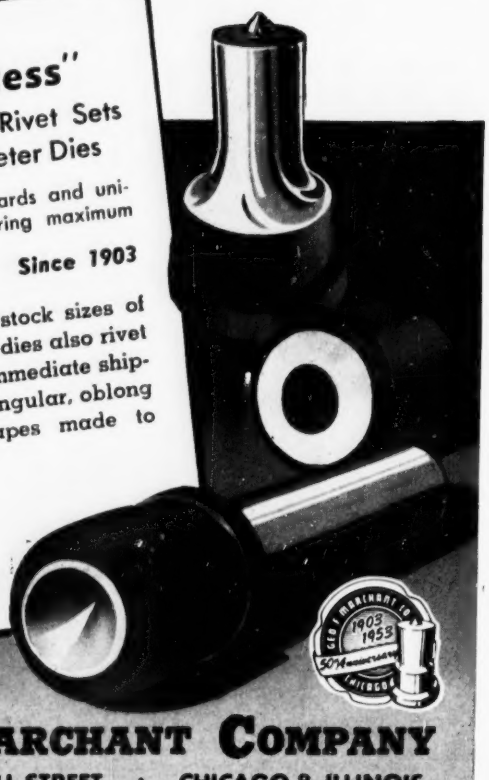

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because ovens have been slowed down. Under these conditions, consumers are reappraising their inventory positions and are restricting fourth quarter orders. Furthermore, there is a feeling that demand for gray iron castings, particularly from the automotive industry, will decline.

Pig Iron . . .

Pig Iron Prices, Page 108

New York—Pig iron sellers report a little pickup in demand as the fall season approaches. However, they do not anticipate any substantial spurt until September gets fairly well along, or until the vacation season is definitely out of the way. Most foundries in this district have fair inventories on hand and in general are not pressing for more tonnage than they already have committed themselves for. Importations continue to lag well behind those in certain other districts along the eastern seaboard.

New York—Blast furnace output in July was at only a slightly lower rate than in June, but because of the longer month of July its total production exceeded that of June.

July production, the American Iron & Steel Institute says, was 6,516,487 net tons, compared with 6,372,531 tons in June. The July total consists of 6,436,345 tons of pig iron and 80,142 tons in ferroalloys.

The July, 1953, blast furnace output far exceeds that of the strike-ridden comparable month of last year. Stacks operated at 96.8 per cent of capacity in July of this year. The June rate was 97.6 per cent.

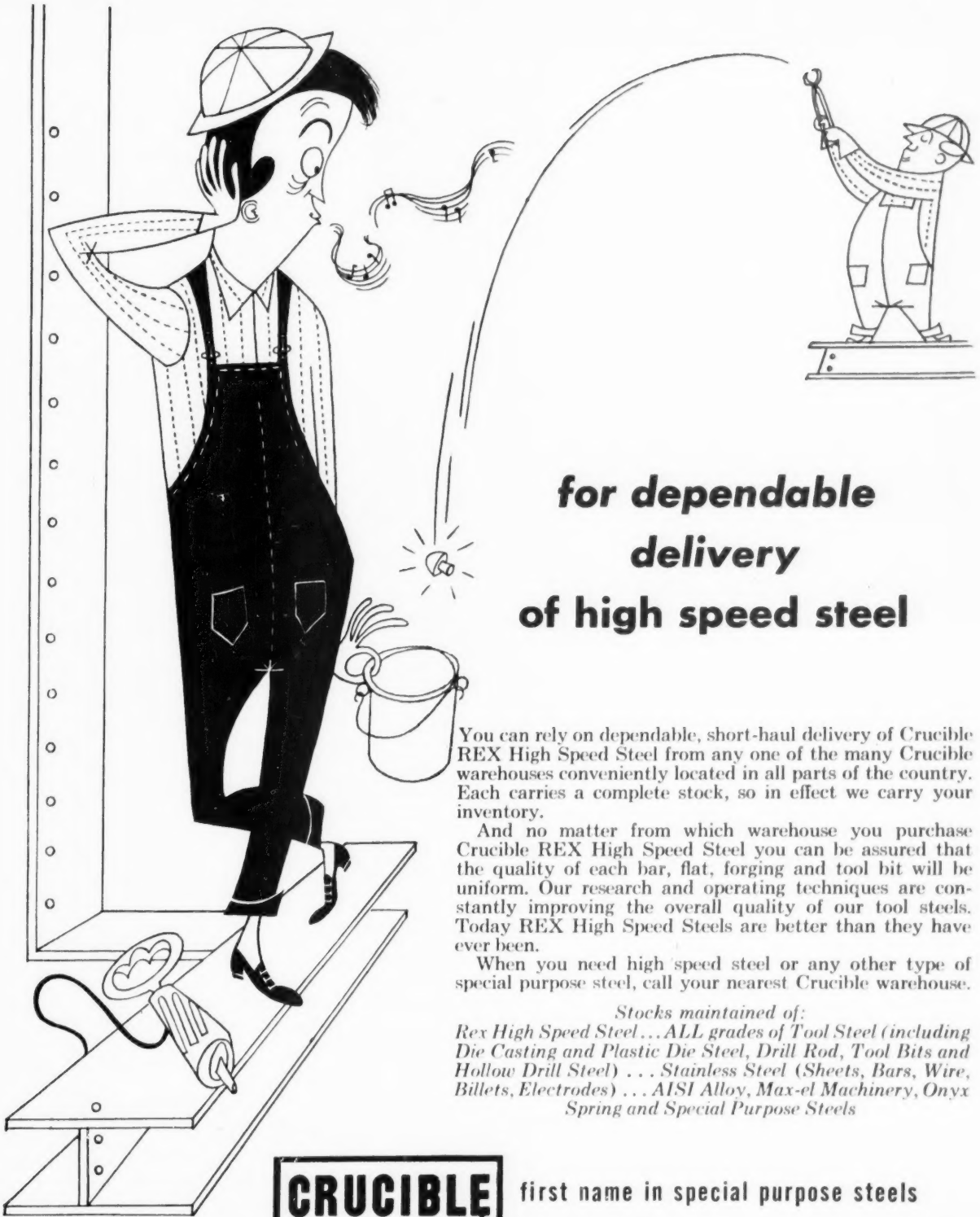
Other comparisons follow:

BLAST FURNACE OUTPUT
(Net Tons)

	Pig Iron	Ferroalloys	Total
1953			
Jan.	6,482,081	82,302	6,564,383
Feb.	5,813,202	68,316	5,881,518
Mar.	6,611,040	66,321	6,677,361
Apr.	6,171,939	58,702	6,230,641
May	6,519,082	68,033	6,587,115
June	6,297,559	74,972	6,372,531
1st Half	37,894,903	418,646	38,313,549
July	6,436,345	80,142	6,516,487
1952			
July	995,975	6,537	1,002,512

Buffalo—Tapering off in demand for merchant pig iron became more pronounced as automotive industry requirements decreased. One leading automotive accessory manufacturer reported a layoff. At best, merchant iron sellers found the situation spotty. However, production held at theoretical capacity with only one of the district's 16 stacks inactive.

Philadelphia—Pig iron sellers anticipate some pick-up within the next couple of weeks. The vacation season will be largely over by that time



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and foundries generally should be back to a normal rate of operation.

Following the granting of a special freight rate from Buffalo to Claymont, Del., applications have been filed for reductions from Buffalo to other points in this area. The rate to Claymont is now $8.86, before tax, against the previous rate of $10.64. This enhances Buffalo's position, but does not make it fully competitive with rates from furnaces located at nearby points.

Pittsburgh—Pig iron business is quiet in this district. Users can get all they want, but they aren't taking much. Competition is being felt from foreign pig iron pricewise, adding to worries of industry men here.

Youngstown—U. S. Steel Corp. has blown out its No. 2 blast furnace at the Ohio Works here for partial relining. The furnace, a 1150-ton unit, will be down for three or four weeks. During the relining, the open hearths will use larger cold-metal charges, increasing heat times and cutting production.

Chicago—There is little direct evidence, thus far, that General Motors Corp.'s halt in output of automatic transmissions at Livonia, Mich., because of the destructive fire, will have marked effect on production of gray iron castings in weeks to come, but a lessened need for castings for automotive use is inescapable.

Currently, pig iron suppliers are shipping all the iron which blast furnaces have available. However, demand isn't pressing.

Of the district's 43 furnaces 39 are in blast but this is about to expand to 40 with Interlake Iron Corp. about to light its rebuilt and enlarged furnace "A" at South Chicago. U. S Steel idled its No. 3 Gary furnace Aug. 15 for lining repairs.

Birmingham—Pig iron is considerably more plentiful in this district, even though there has been some increase in demand over the past several weeks. Merchant iron producers are looking for additional business and each has one blast furnace idle.

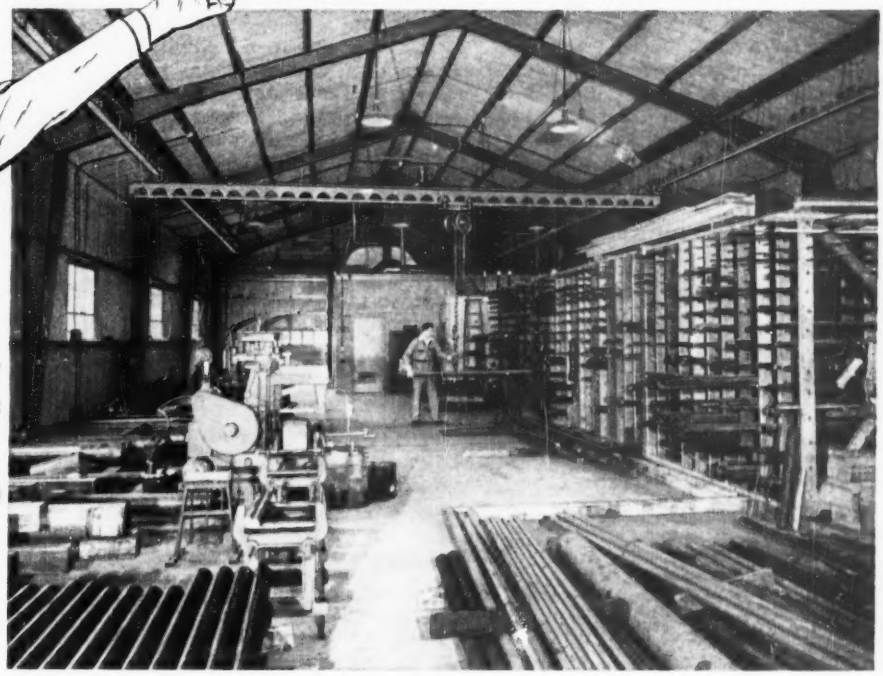
Iron Ore . . .

Iron Ore Prices, Page 127

Cleveland—Stocks of iron ore at blast furnaces and on lower Lake Erie docks had risen to 38,828,970 gross tons on Aug. 1, the Lake Superior Iron Ore Association reports. A month earlier they totaled 32,069,689 tons. On Aug. 1, 1952, stocks had been held down by the steelworkers' strike to 27,387,800 tons.

Iron ore consumption by U. S. and

HERE'S SIMPLE ARITHMETIC on PREFABS:



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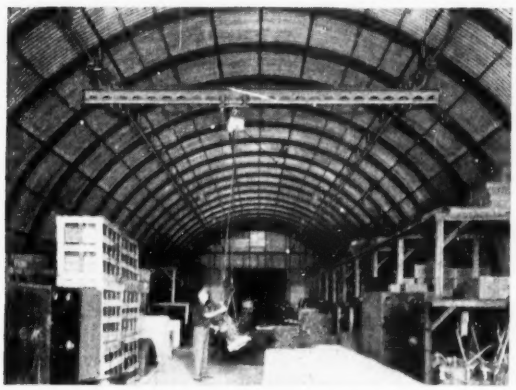

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Canadian furnaces during July totaled 8,239,024 tons, compared with 8,056,067 tons in June and only 1,544,061 tons in June, 1952.

Of 205 blast furnaces in the U. S. and Canada that depend principally on Lake Superior ore, 190 were in blast on Aug. 1, leaving idle 15, the same number as a month earlier. The number of blast furnaces depending largely on Lake Superior ore increased during July to 205 with the addition of a new furnace, "No. 6," for Algoma Steel Corp. at Sault Ste. Marie, Ont.

Scrap . . .

Scrap Prices, Page 130

Buffalo — Scrap prices plunged $1.50 to $3 a ton here on new buying by the leading mill consumer. Weakness was attributed to substantial inventories and a cutback in orders. Dealers also are disappointed in the small tonnage specified on new orders which indicate additional weakness.

New business was booked last week in No. 2 heavy melting and bundles at levels $3 below previously quoted prices. The price on No. 1 heavy melting dropped $1.50 a ton.

A weak cast market also joined in the downward movement with No. 1 cupola cast selling at $38 to $38.50.

Philadelphia — Further easing in open-hearth steel scrap is reflected in a drop in No. 2 heavy melting to $37-$38, delivered, and in No. 2 bundles to $34.50. Prime grades are unchanged. Electric furnace bundles are nominally unchanged at $44-$45, delivered, with no recent sales to test the market. Structurals and plate scrap are off slightly to $46. Such business as has developed recently has been for the account of the smaller consumers.

Heavy turnings are off to a flat price of $41, delivered. Short shovel turnings are $32 against an erroneous price of $31 last week.

In cast grades, unstripped motor blocks are nominally lower at $31, delivered, and drop broken machinery, $47.

Boston — Buying has slowed to practically a halt in both steel and cast grades. This is reflected by pressure on prices for limited tonnage negotiated. No. 2 heavy melting steel and bundles are off $1 a ton. Cast scrap is easy.

New York—Heavy melting grades of steel scrap are lower, both No. 2 steel and bundles. No. 1 is nominal at $34 to $35, brokers' buying price, while No. 2 is down more than $1 a ton.

Buying is slow with consumer inventories substantial. Many are not buying up to current rate of consumption and are actually reducing inventory in many cases.

Cast iron scrap is slow and there is no market for unstripped motor blocks.

Pittsburgh—Nearly all scrap prices declined in a weak market. Several small volume purchases were made, generally below last week's rates.

No. 1 heavy melting fell to a $44-$45 range. Other open-hearth and blast furnace grades dropped similarly. No indication is seen of renewed activity in these grades.

Cincinnati—All scrap prices in this district are nominal. The market appears to be growing continuously weaker. There are no orders for scrap in this area and almost no interest in buying. There are indications that substantially lower prices are in the making. Estimates for open-hearth grades show a decline of $5 a ton. Declines vary throughout other grades from $1 to $3 a ton.

Cleveland — Scrap prices broke $2 to $3 a ton in this district last week and undoubtedly will decline further during the next few weeks. Some

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market interests anticipate a drop of $10 a ton below recently prevailing levels.

Weakness is attributed basically to the tapering in consumption. Volume of scrap generated in industrial plants is smaller, but consumers have reduced their buying even more sharply. As a result, some dealers have accumulated larger than normal stocks.

No. 1 heavy melting is quoted $41 to $42; machine shop turnings, $21 to $22; No. 1 cupola cast $43 to $44. Other grades are off proportionately. Pending issuance of railroad lists early next month, No. 1 railroad heavy melting is nominally unchanged.

Detroit—As lists began closing in Detroit last week it was evident that scrap volume would be off about 25 per cent. However, prices seem to be holding at or near present levels. Observers theorize that the lessening demand for steel is offsetting the lessening demand for scrap, delaying a downward revision here.

Chicago—In face of light demand and limited buying by consumers virtually all grades of scrap have lost further ground price-wise. Prices are off about $2 a ton almost across the board. Only in a few cases are prices supported by sales—for the most part they represent the figures at which brokers will sell. On this basis No. 1 heavy melting steel figures at $42 a ton and No. 1 factory bundles at $43. One important steel maker delayed its acquisition of material for September delivery and another is out of the market completely for the time being.

St. Louis—Rail scrap prices remain unexpectedly firm as a result of fewer lists hitting the market last week. Mills are still taking some at the old prices. Quotations on all scrap grades remain unchanged in response to scattered but unseasonally light demand. The surprise of the local market, in fact, is the continued indifference of mills to winter stockpiling in the face of an abundance of selected grades. It reflects an over-all wait-and-see attitude by consumers. Mills want to see what their fourth quarter orders look like before adding to present comfortable stockpiles.

Seattle—Although Bethlehem Pacific Coast Steel Corp., Seattle, has announced no increase in steel scrap prices, brokers report that the market has advanced $2, raising No. 1 heavy melting to $33 and No. 2 to $29.

This move was initiated by Oregon Steel Mills, Portland, Oreg., which has a large backlog and plans to build up its inventory accordingly.

The higher level has not induced a flood of scrap but shipments have increased. Not a large quantity is said to be available in the interior and with the approach of colder weather receipts are expected to decline, prices to firm.

Tubular Goods . . .

Tubular Goods Prices, Page 107

Pittsburgh—A decline has occurred in demand for seamless tubing from automakers. Military orders are holding up well in quantity, although holdbacks are prevalent.

Producers of specialty tubing are sharpening their sales efforts in this district. Orders are readily available, but salesmen now must go out and get them.

Boston—Lead time on butt weld pipe orders for October has been shortened and distributors are not taking all tonnage offered. Prices with distributors are also softening. Mills' stocks of butt weld pipe stocks are heavier. While this grade is easiest,

(*Please Turn to Page* 129)

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Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $200, Etna, Johnstown and Sheridan, Pa.; add or subtract $2.00 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.
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Manganese metal, 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max): Carload, lump, bulk, 36.2c per lb of metal; packed, 36.95c; ton lot 38.45c; less ton lots 40.45c. Delivered. Spot, add 2c.

Electromanganese: Carload, 31.5c; ton lots 33.5c; 250 to 1999 lb, 35.5c. Premium for hydrogen-removed metal, 1.5c per pound, f.o.b. cars Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 11.4c per lb of alloy, carload packed, 12.15c, ton lots 13.05c, less ton 14.05c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max. Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%.) Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 24.75c per lb of contained Cr; c.l., packed 25.65c, ton lot 26.80c, less ton 28.20c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%) Contract, carload, lump, bulk, max. 0.025% C (simplex) 34.50c per lb contained Cr, 0.03% C 36.50c, 0.04% C 35.50c, 0.06% C 34.50c, 0.10% C 34.00c, 0.15% C 33.75c, 0.20% C 33.50c, 0.50% C 33.25c, 1% C 33.00c, 1.50% C 32.85c, 2% C 32.75c. Carload packed add 1.1c, ton lot 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High Carbon: (Cr 62-66%, C 5-7%) Contract, c.l. S M x D, bulk, 26.25c per lb contained Cr. Packed, c.l. 27.15c, ton 28.50c, less ton 30.25c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max.) Contract, carload, packed, 8 M x D, 18.35c per lb of alloy; ton lot 19.2c; less ton lot, 20.4c, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max.) Contract, carload, lump, 4" x down and 2" x down, bulk, 25.75c per lb of contained chromium plus 12.4c per pound of contained silicon; 1" x down, bulk 25.90c per pound of contained chromium plus 12.60c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Ferrochrome Silicon, No. 2: (Cr. 36-39%, Si 26-39%, Al 7-9%, C 0.05% max.) 25.75c per lb of contained chrome plus 12.4c per lb of contained silicon plus aluminum 3" x down delivered.

Chromium Metal: (Min 97% Cr and 1% Fe; contract, 1" x D; packed, max 0.50%, carload $1.12, ton lots $1.14, less ton $1.16. Delivered. Spot, add 5c. Prices on 0.10 per cent carbon grade, add 4c to above prices.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 35-55%, Si 8-12% max, C 3-3.5% max). Contract, any quantity, $3.00 per lb of contained V. Delivered. Spot, add 10c. **Crucible-Special Grades** (V 35-55%, Si 2-3.5% max, C 0.5-1% max), $3.10. **Primos and High Speed Grades** (V 35-55%, 1.50% max, C 0.20% max) $3.20.

Grainal: Vanadium Grainal No. 1, $1 per lb, No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si, packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12.40c per lb of contained Si, carload packed 14.0c, ton lot 15.45c, less ton 17.1c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 14.3c per lb of contained Si, carload packed 15.6c, ton lot 16.75c, less ton 18.0c. Delivered. Spot, add 0.8c.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 17.0c per lb of contained Si, carload packed 18.2c, ton lot 19.15c, less ton 20.2c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min 97% Si and 1% max Fe) C.l. lump, bulk, regular 18.5c per lb of Si, c.l. packed 19.7c, ton lot 20.6c, less ton 21.6c. Add 0.5c for max. 0.10% calcium grade. Deduct 0.5c for max 2% Fe grade analyzing min 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.90c per lb of alloy, ton lots packed 11.30c, 20 to 1999 lb 11.65c, smaller lots 12.15c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max.). Contract, c.l. lump bulk 8.0c per lb of alloy, c.l. packed 8.75c, ton lot 9.5c, less ton 10.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y. freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 19.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3% lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 16.25c per lb of briquet, carload packed 16.95c, ton 17.75c, less ton 18.65c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 12.45c per lb or briquet, c.l. packaged 13.25c, ton lot 14.05c, less ton 14.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 12.65c, per lb of briquet, c.l. packaged 13.45c, ton lot 14.25c, less ton 15.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size — weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.95c per lb of briquet. Packed c.l. 7.75c, ton lot 8.85c, less ton 9.45c. Delivered. Spot, add 0.25c.
(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 7.1c. Packed c.l. 7.9c, ton lot 8.7c, less ton 9.6c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.ob. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 10,000 lb W or more, $4.35 per lb of contained W; 2000 lb W to 10,000 lb W, $4.45; less than 2000 lb W, $4.57, f.o.b. Niagara Falls, N. Y.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 56-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $6.40 per lb of contained Cb, less ton $6.45. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx. Ta 20% approx. and Cb and Ta 60% min, C 0.30% max) ton lots, 2" x D, $4.75 per lb of contained Cb plus Ta, deld.; less ton lots $4.80.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed, 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, carload, packed, ½" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Deld. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.50c per lb of alloy; ton lots 18.50c; less ton lots 20c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 15c per lb of alloy; ton lots 16.50c; less ton lots 17.75c, f.o.b., Niagara Falls; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe) Lump, carload, bulk 14.50c. Packed c.l. 15.50, ton lots, 15.75c, less ton lots, 16.25c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, f.o.b. Langeloth, $1.32 in all sizes except powdered which is $1.41; Washington, Pa., furnace, any quantity $1.32.

Technical Molybdic-Oxide: Per lb. contained Mo, f.o.b. Langeloth, Pa., $1.14 in cans; in bags, $1.13, f.o.b. Langeloth, Pa.; Washington, Pa., $1.13.

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Lockheed Aircraft Corporation recently conducted a person-to-person canvass that put a Payroll Savings Application Blank in the hands of every employee of Lockheed's eleven plants in Southern California. At the conclusion of this one-week campaign, 36,419 of the 38,037 employees—95.7%—had signed up on the Payroll Savings Plan. Three of the eleven plants achieved 100% enrollment.

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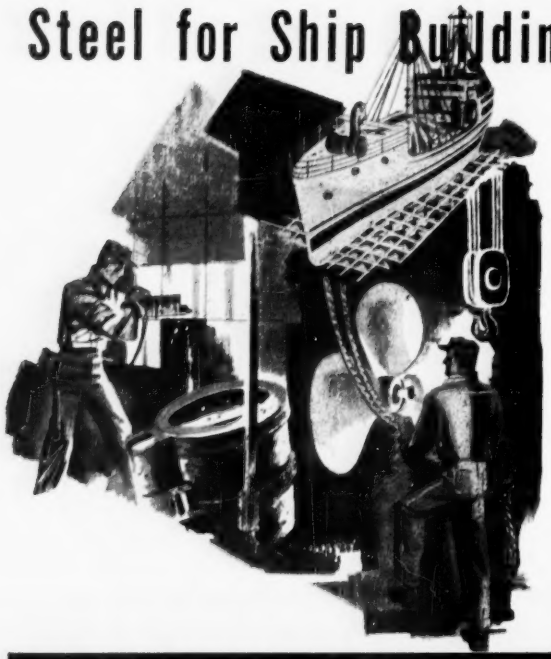

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ORES-COKE-REFRACTORIES

Prices as reported to STEEL; changes shown in italics.

ORES

Lake Superior Iron Ore

(Prices effective July 1, 1953, and thereafter; gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$10.30
Old range nonbessemer	10.15
Mesabi bessemer	10.05
Mesabi nonbessemer	9.90
Open-hearth lump	11.15
High phosphorus	9.90

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon which were in effect on June 24, 1953, and increases or decreases after such date are for buyer's account.

Eastern Local Iron Ore

Cents per unit del. E. Pa.

Foundry and basic 56-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	nom.
Long-term contract	22.00
North African hematites (spot)	24.00-26.00
Brazilian iron ore, 68-69% (spot)	25.00

Tungsten Ore

Net ton unit, duty paid

Foreign wolframite and scheelite, per net ton unit	$55.00
Domestic scheelite, mine	63.00

Manganese Ore

Manganese, 48% nearby, $1.18-1.21 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; shipments against old contracts for 48% ore are being received from some sources at 90-93c.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$40.00-$42.00
48% 3:1	44.00-46.00
48% no ratio	32.00-34.00

South African Transvaal

44% no ratio	$27.00-28.00
48% no ratio	34.00-35.00

Brazilian

44% 2.5:1 lump	nom. $32

Domestic

(Rail nearest seller)

48% 3:1	$39.00

Molybdenum

Sulphide concentrates per lb. molybdenum content, mines	$1.00

REFRACTORIES

Fire Clay Brick

High-Heat Duty: Pueblo, Colo., $89.00; Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lochhaven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., Woodbridge, N. J., $109.00; Salina, Pa., $114.00; Niles, O., $109; Los Angeles, Pittsburg, Calif., $132.30.

Silica Brick

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., $115.00; Hays, Pa., $120.00; Niles, O., $107; E. Chicago, Ind., Joliet, Rockdale, Ill., $125.00; Cutler, Utah, $116.55, Los Angeles, $122.85.

Insulating Fire Brick

2300° *F:* Massillon, O., $178.50; Clearfield, Pa., $197.50; Augusta, Ga., Beaver Falls, Zelienople, Pa., Mexico, Mo., $186.90.

Ladle Brick

Dry Pressed: Bessemer, Ala., $64.60; Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Wellsville, O., $77.50; Mexico, Mo., $73.50; Clearfield, Pa., Portsmouth, O., $83; Perla, Ark., $109.00; Los Angeles, $110.25; Pittsburg, Calif., $111.30.

Sleeves

Reesdale, Pa., $139.70; Johnstown, Pa., $140.00; Clearfield, Pa., $148.50; St. Louis, $151.80; Athens, Tex., $155.00.

Nozzles

Reesdale, Pa., $223.50; Johnstown, Pa., $229.20; Clearfield, Pa., $241.40; St. Louis, $247.10; Athens, Tex., $247.70.

Runners

Reesdale, Pa., $174.00; Johnstown, Pa., $177.80; Clearfield, Pa., $185.50; St. Louis, $187.30; Athens, Tex., $191.90.

High-Alumina Brick

50 *Per Cent:* Clearfield, Pa., St. Louis, Mexico, Mo., $179.00; Danville, Ill., $169.30.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $223.00; Danville, Ill., $213.20.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $255.00; Danville, Ill., $258.00; Clearfield, Pa., $252.

Dolomite

Domestic, dead-burned bulk; Billmeyer, Blue Bell, Williams, Plymouth Meeting, Pa., Millville, W. Va., Millersville, Martin, Gibsonburg, Woodville, O., $13.75; Thornton, McCook, Ill., $13.85; Dolly Siding, Bonne Terre, Mo., $13.65; Narlo and Bettsville, O., $14.50.

Magnesite

Domestic, deadburned bulk; Luning, Nev., $38.

METALLURGICAL COKE

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.50-15.00
Connellsville, foundry	16.50-17.00
New River foundry	20.80
Wise county foundry	15.95
Wise county, furnace	15.20

Oven Foundry Coke

Kearney, N. J. ovens	$24.00
Everett, Mass., ovens	
New England, del.	*26.00
Chicago ovens	24.50
Chicago, del.	26.00
Terre Haute, ovens	24.05
Milwaukee, ovens	25.25
Indianapolis, ovens	24.25
Chicago, del.	28.12
Cincinnati, del.	25.85
Painesville, O., ovens	25.50
Cleveland, del.	27.43
Erie, Pa., ovens	25.00
Birmingham, ovens	21.65
Cincinnati, del.	26.58
Lone Star, Tex., ovens	18.50
Philadelphia, ovens	23.95
Swedeland, Pa., ovens	23.85
St. Louis, ovens	
St. Louis, del.	26.00
St. Paul, ovens	23.75
Portsmouth, O., ovens	24.00
Cincinnati, del.	26.62
Detroit, ovens	25.50
Detroit, del.	26.50
Buffalo, del.	28.08
Flint, del.	28.23
Pontiac, del.	27.06
Saginaw, del.	28.58

*Or within $4.55 freight zone from works.

COAL CHEMICALS

Spot, cents per gallon, ovens

Pure benzol	36.00
Toluol, one deg.	30.00-33.00
Industrial xylol	30.00-33.50

Per ton, bulk, ovens

Sulphate of ammonia	$44-45
Birmingham area	$49.50

Cents per pound, ovens

Phenol, 40 (carlots, nonreturnable drums)	17.25

FLUORSPAR

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GRAPHITE

Inches Diam.	Length	Cents per lb
17,18,20	60,72	17.85
8 to 16	48,60,72	17.85
7	48,60	19.57
6	48,60	20.95

CARBON

35,40	110	8.03
30	65,84,110	8.03
24	72 to 104	8.03
17 to 20	34,90	8.03

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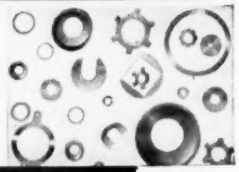

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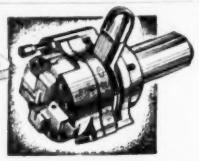


famous for accuracy and straightness of threads, low chaser costs, less downtime, more pieces per day.

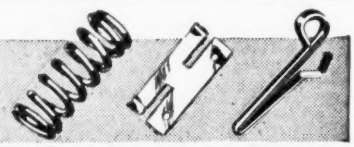
THE EASTERN MACHINE SCREW CORP., 22-42 Barclay Street, New Haven, Conn.
Pacific Coast Representative: *A. C. Berbringer, 334 N. San Pedro St., Los Angeles, California.* Canada: *F. P. Barber Machinery Co., Toronto, Canada.*

The Cleveland Steel Tool Co.
• PUNCHES • DIES • CHISELS • RIVET SETS •

IF IT'S *RIVETED* YOU KNOW IT'S SAFE

WE FEATURE SPECIAL PUNCHES & DIES
660 E. 82nd ST., CLEVELAND, O.

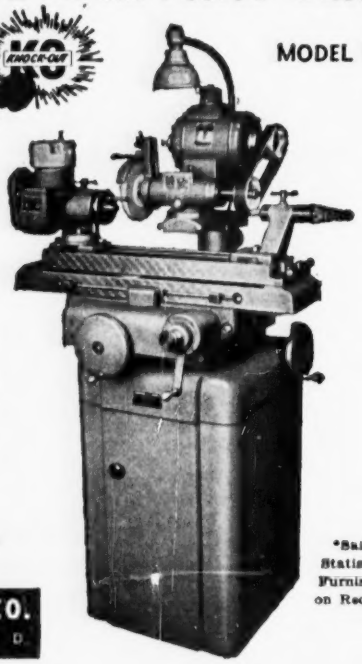
SPRINGS
STAMPINGS
WIRE FORMS



M. D. Hubbard Spring Company
604 CENTRAL AVE. PONTIAC, MICH.

There's a reason 76%* of all popularly-priced Tool and Cutter Grinders sold in 1952 were "Knock-Outs"

MODEL B860



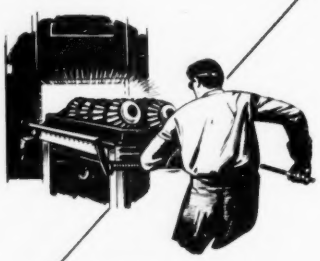
Will do anything that machines costing 2 or 3 times more will do . . . yes and in less time.

Distributed Only Through Franchise Dealers

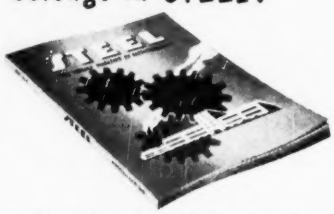
K. O. LEE CO.
ABERDEEN S. D.

*Sales Statistics Furnished on Request

If your product belongs in Metalworking



. . . your advertising belongs in STEEL!



You advertise in STEEL to reach ALL 4 buying influences . . . management, production, engineering, purchasing.

(*Concluded from Page* 123)

other pipe products reflect trend in that direction. Some seamless in lowest and larger size ranges is not being taken at allotment level.

Seattle—Cast iron pipe agencies report business slow, no important projects being up for bids. Cottage Grove, Oreg., has awarded 400 tons. Some small lots are moving out of warehouses.

Canada . . .

Toronto, Ont.—Iron and steel production in Canada made new monthly high records in May, as well as for the first five months of this year.

For May, pig iron production amounted to 271,461 net tons compared with 241,583 tons in April and 237,079 tons in May, 1952.

In the five months ending with May, pig iron production totaled 1,221,404 net tons compared with 1,100,479 tons in the corresponding period of 1952.

Production of steel ingots and castings in May amounted to 368,967 net tons, or 93.9 per cent of capacity, against 362,291 tons, or 95.3 per cent, for April and 330,524 tons, or 98.8 per cent, for May, 1952.

For the first five months this year, steel production totaled 1,770,943 net tons compared with 1,609,460 net tons in the like period of 1952

New Steel Manual Coming . . .

The government steel procurement manual on which a technical committee of the American Iron & Steel Institute has been working for some months has been printed in first-draft form. Revisions will be discussed Sept. 3 in a meeting of the AISI metallurgists with the Office of Standardization, Department of Defense, following which copies will be submitted to the industry and to all interested government departments and agencies for comments and suggestions.

Exploration Activities Rise . . .

The Defense Materials Exploration Agency signed 26 new mineral exploration contracts in July, the largest number signed in any month since Nov., 1952, to bring to 543 the total number of contracts executed since the government's strategic minerals program began.

With the new July obligations estimated to cost $1,082,859, a monthly total exceeded only twice in the past 17 months, the government's share was $632,924.

Forty applications were denied in July, the largest number since Oct., 1951. Two additional certifications, made when the government considers that an exploration project has yielded ore in sufficient quantity for possible commercial production within 10 years, were made during the month. One was for mica mining in North Carolina, the other was for uranium development in Colorado.

Superior Tube Adds Furnace . . .

A vacuum furnace for annealing tubing of titanium and zirconium is being installed at the Superior Tube Co. plant at Norristown, Pa. The installation will help the firm meet demand for its new line of small titanium tubing, officials relate.

After six years of experimentation Superior has achieved mass production of titanium tubing in OD sizes from 0.125″ to 1.500″ and in wall thicknesses from 0.004″ to 0.187″. Tubing is produced in both seamless and the new patented Weldrawn processes.

The raw material for zirconium is under close governmental control and only experimental quantities of the tubing can be offered to customers.

Another development announced by Superior is its commercial production of thin-wall, seamless, stainless steel tubing in sizes ranging up to 2-1/16″ OD.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3500 tons, gates, guides and other appurtenances, The Dalles, Oreg., powerhouse, to Pacific Car & Foundry Co., Seattle; Dalles, Oreg., Powerhouse Constructors, general contractors.

2851 tons, state thruway, Monroe county, New York, through Arthur A. Johnson Corp., to American Bridge Division, United States Steel Corp., Pittsburgh.

1202 tons, state thruway bridge work, Westchester county, New York, through Rusciano & Sons Corp., to American Bridge Division, United States Steel Corp.

965 tons, fertilizer plant, Joplin, Mo., through Merritt, Chapman & Smith Corp., New York, to Gate City Steel Works Inc., Omaha, Nebr.

900 tons, boiler supports, Central, Tex., for Combustion Engineering Inc., New York, to Consolidated Western Steel Division, United States Steel Corp., Los Angeles.

750 tons, boiler supports, Salt Lake City, Utah, for Combustion Engineering Inc., New York, to Maxwell Steel Co., Ft. Worth, Tex.

710 tons, overpass, 96th street and Roosevelt drive, New York, to Bethlehem Steel Co., Bethlehem, Pa.

540 tons, boiler supports, Kansas City, Mo., for Combustion Engineering Inc., New York to American Bridge Division, United States Steel Corp.

525 tons, parking garage, Skyway Service Stations, New York, to Sherry-Gordon Inc., Bronx, that city.

325 tons, research laboratory for American Can Co., New York, at Lombard, Ill., to Mt. Vernon Bridge Co., Mt. Vernon, O.

305 tons, Westchester Health Center and Library, Bronx, New York, through Planet Construction Co., to Schacht Steel Construction Inc., New York.

230 tons, bridge approaches, Lowell, Mass., to West End Iron Works, Cambridge, Mass.; Coleman Bros. Corp., Boston, general contractor.

217 tons, state bridge, Bucks county, Pennsylvania, to Bethlehem Steel Co.

210 tons, bridge work, state thruway, Schenectady county, New York, through Dornelli Construction Co., subcontractor, to Ernst Iron Works Inc., Bethlehem, Pa.

185 tons, industrial building, Mountainside, N. J., through Frank D. Trainer & Son, to H. R. Goeller Inc., Hillside, N. J.

165 tons, warehouse, J. R. Quigley Co., Lancaster, Pa., through Irwin & Leighton, Philadelphia, to Bethlehem Contracting Co., Bethlehem, Pa.

160 tons, plant addition, Lansdale Tube Co., Lansdale, Pa., to Belmont Iron Works, Eddystone, Pa.

151 tons, state bridge work, Nassau county, New York, through Horn Construction Co., to Bethlehem Steel Co.

110 tons, building, YWCA, Bronx, New York, to Schacht Steel Construction Inc., New York.

110 tons, building, Du Pont interests, Parlin, N. J., to Bethlehem Fabricators Inc., Bethlehem, Pa.

100 tons, brewery plant addition, Tacoma.

(*Please Turn to Page* 132)

WARD STEEL CO.

We specialize in
FINISHED STEEL BARS—TUBES—STRIP

PROMPT WAREHOUSE SERVICE ONLY

Most Complete Stock in America of
BLUE TEMPERED SPRING STEEL

We believe that the way to sell is to carry a stock which permits satisfying any reasonable warehouse demand.

87A Rindge Ave. Ext. Phone UN 4-2460
CAMBRIDGE 40, MASS.

Branches
3042-3058 W. 51st Street, CHICAGO, ILL.
Phone: Grove Hill 6-2600

Fenner Street, Providence, R. I.
Phone: Gaspee 1-3573, 1-8573

IRON AND STEEL SCRAP

Consumer prices, per gross ton, except as otherwise noted, including broker's commissions, as reported to STEEL. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

Aug. 27	$43.17
Aug. 20	44.17
July avg.	43.51
Aug. 1952	43.00
Aug. 1948	43.33

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

(Delivered consumer plant)

No. 1 heavy melting	*44.00-45.00*
No. 2 heavy melting	*41.00-42.00*
No. 1 bundles	*44.00-45.00*
No. 2 bundles	*38.00-39.00*
No. 1 busheling	44.00-45.00
Machine shop turnings	*26.00-27.00*
Mixed borings, turnings	*29.00-30.00*
Short shovel turnings	*30.00-31.00*
Cast iron borings	*29.00-30.00*
Cut structurals	*47.00-48.00*
Heavy turnings	*40.00-41.00*
Punchings & plate scrap	*48.00-49.00*
Electric furnace bundles	*47.00-48.00*

Cast Iron Grades

No. 1 cupola	*42.00-43.00*
Charging box cast	*41.00-42.00*
Heavy breakable cast	*39.00-40.00*
Unstripped motor block	35.00-36.00
No. 1 machinery cast	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt.	46.00-47.00
Rails, 2-ft. and under.	53.00-54.00
Rails, 18-in. and under	54.00-55.00
Rails, random lengths	49.00-50.00
Railroad specialties	*50.50-51.50*

CLEVELAND

(Delivered consumer plant)

No. 1 heavy melting	*41.00-42.00*
No. 2 heavy melting	*38.00-39.00*
No. 1 bundles	*41.00-42.00*
No. 2 bundles	*36.00-37.00*
No. 1 busheling	*41.00-42.00*
Machine shop turnings	*21.00-22.00*
Mixed borings, turnings	*27.00-28.00*
Short shovel turnings	*25.00-26.00*
Cast iron borings	*25.00-26.00*
Low phos.	*43.00-44.00*
Alloy free, short shovel turnings	*28.00-29.00*
Electric furnace bundles	*42.00-43.00*

Cast Iron Grades

No. 1 cupola	*43.00-44.00*
Charging box cast	*42.00-43.00*
Stove plate	*41.00-42.00*
Heavy breakable cast	*36.00-37.00*
Unstripped motor blocks	*25.00-26.00*
Brake shoes	*36.00-37.00*
Clean auto cast	*44.00-45.00*
No. 1 wheels	*38.00-39.00*
Burnt cast	*33.00-34.00*
Drop broken machinery	*47.00-48.00*

Railroad Scrap

No. 1 R.R. heavy melt.	46.00-47.00
R. R. Malleable	*48.00-49.00*
Rails, 3-ft. and under.	52.00-53.00
Rails, 18 in. and under	*53.00-54.00*
Rails, random lengths	*45.00-46.00*
Cast steel	*48.00-49.00*
Railroad specialties	*50.00-51.00*
Uncut tires	*49.00-50.00*
Angles, splice bars	*51.00-52.00*
Rails, rerolling	*53.00-54.00*

YOUNGSTOWN

(Delivered consumer plant)

No. 1 heavy melting	*42.00-43.00*
No. 2 heavy melting	*37.00-38.00*
No. 1 bundles	*42.00-43.00*
No. 2 bundles	*35.00-36.00*
Machine shop turnings	*23.00-24.00*
Short shovel turnings	*29.00-30.00*
Cast iron borings	31.00-32.00
Low phos.	*46.00-47.00*
Electric furnace bundles	*45.00-46.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*47.00-48.00*

PHILADELPHIA

(Delivered consumer plant)

No. 1 heavy melting	42.00-43.00
No. 2 heavy melting	*37.00-38.00*
No. 1 bundles	42.00-43.00
No. 2 bundles	*34.50*
No. 1 busheling	42.00-43.00
Electric furnace bundles	44.00-45.00
Machine shop turnings	27.00
Mixed borings, turnings	30.00-31.00
Short shovel turnings	32.00
Structurals & plate	*46.00*
Heavy turnings	*41.00*
Couplers, springs, wheels	49.50-50.00

Cast Iron Grades

No. 1 cupola	38.00
Charging box cast	40.00
Heavy breakable cast	41.00-42.00
Unstripped motor blocks	*31.00*
Drop broken machinery	*47.00*

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*34.00-35.00*
No. 2 heavy melting	*29.00-30.00*
No. 1 bundles	*34.00-35.00*
No. 2 bundles	*27.00-28.00*
Machine shop turnings	18.00-19.00
Mixed, borings, short turnings	21.00-22.00
Low phos. (structural & plate)	38.00-39.00
Short shovel turnings.	22.00-23.00

Cast Iron Grades

No. 1 cupola	32.00-33.00
Unstripped motor blocks	24.00-25.00

DETROIT

No. 1 heavy melting	37.50-38.50
No. 2 heavy melting	33.00-34.00
No. 1 bundles	40.00-41.00
No. 2 bundles	30.00-31.00
No. 1 busheling	35.00-36.00
Machine shop turnings	17.00-18.00
Mixed borings turnings	19.00-20.00
Short shovel turnings	21.00-22.00
Punchings & plate scrap	39.00-40.00

Cast Iron Grades

No. 1 cupola	43.00
Charging box cast	34.00-35.00
Stove plate	34.00-35.00
Heavy breakable	29.00-30.00
Unstripped motor blocks	30.00
Clean auto cast	42.00-43.00
Malleable	44.00

CINCINNATI

(Brokers' buying prices)

No. 1 heavy melting	*38.00*
No. 2 heavy melting	*35.00*
No. 1 bundles	*38.00*
No. 2 bundles	*32.00*
No. 1 busheling	*38.00*
Machine shop turnings	*17.00**
Mixed borings, turnings	*20.00**
Short shovel turnings	*21.00**
Cast iron borings	*20.00**

Cast Iron Grades

No. 1 cupola	*44.00*
Charging box cast	40.00
Heavy breakable cast	*38.00*
Drop broken machinery	*49.00*

Railroad Scrap

No. 1 R.R., heavy melt	*44.00*
Malleable	47.00
Rails, 18-in. and under	*54.00*
Rails, random lengths	*46.00*

*F.o.b. shipping point.

CHICAGO

No. 1 heavy melting	*39.00-40.00*
No. 2 heavy melting	*34.00-35.00*
No. 1 factory bundles	*41.00-42.00*
No. 1 dealer bundles	*39.00-40.00*
No. 2 bundles	32.00-33.00
No. 1 busheling	*39.00-40.00*
Machine shop turnings	*19.00-20.00*
Mixed borings, turnings	*21.00-22.00*
Short shovel turnings	*21.00-22.00*
Cast iron borings	*21.00-22.00*
Cut Structurals, 3-ft.	*44.00-45.00*
Punchings & plate scrap	*43.00-44.00*
Electric furnace bundles	*41.00-43.00*

Cast Iron Grades

No. 1 cupola	*40.00-42.00*
Stove plate	*33.00-35.00*
Unstripped motor blocks	*33.00-35.00*
Clean auto cast	*43.00-45.00*
Drop broken machinery	*43.00-45.00*

Railroad Scrap

No. 1 R.R. heavy melt	*42.00-44.00*
R.R. Malleable	43.00-45.00
Rails, 2-ft. and under	*52.00-53.00*
Rails, 18 in. and under	*53.00-54.00*
Angles, splice bars	*49.00-50.00*
Rails, rerolling	*54.00-55.00*

BIRMINGHAM

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	27.00-28.00
No. 1 bundles	29.50-30.50
No. 2 bundles	29.00-30.00
Machine shop turnings	20.75-21.75
Short shovel turnings	22.75-23.75
Cast iron borings	22.75-23.75
Cut structurals	39.00-40.00
Electric furnace bundles	32.00-33.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	39.00-40.00
Charging box cast	30.00-31.00
Stove plate	35.00-36.00
Heavy breakable cast	30.00-31.00
Unstripped motor blocks	34.00-35.00
No. 1 wheels	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	35.00-36.00
Rails, 2-ft and under.	45.00-46.00
Rails, random lengths	42.00-43.00
Angles, splice bars	45.00-46.00
Rails, rerolling	45.00-46.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	43.00-44.00
No. 2 heavy melting	32.50-33.50
No. 1 bundles	37.00-38.00
No. 2 bundles	30.00-31.00
Machine shop turnings	17.00-18.00
Short shovel turnings	19.00-21.00

Cast Iron Grades

No. 1 cupola	41.00-42.00
Charging box cast	35.00-36.00
Heavy breakable cast	35.00-36.00
Unstripped motor blocks	34.00-35.00
Brake shoes	41.00
Clean auto cast	44.00
Burnt cast	34.00-35.00

Railroad Scrap

Malleable	42.00-43.00
Rails, 18-in. and under	50.00-51.00
Rails, random lengths	46.00-48.00
Uncut tires	44.00-45.00
Angles, splice bars	46.00-47.00
Rails, rerolling	51.00-53.00

BUFFALO

No. 1 heavy melting	*42.00-43.00*
No. 2 heavy melting	*37.00-37.50*
No. 2 bundles	*35.00-35.50*
No. 1 bundles	*42.00-43.00*
No. 1 busheling	*42.00-43.00*
Machine shop turnings	*23.00-24.00*
Mixed borings, turnings	*27.50-28.00*
Short shovel turnings	*28.50-29.00*
Cast iron borings	*28.50-29.00*
Low phos.	*45.00-46.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	*38.00-38.50*
No. 1 machinery	*42.00-42.50*

Railroad Scrap

Rails, random lengths	*46.50-47.00*
Rails, 2 ft and under	*51.50-52.00*

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*31.00-31.50*
No. 2 heavy melting	*27.00-27.50*
No. 1 bundles	*31.00-31.50*
No. 2 bundles	*25.00-25.50*
Machine shop turnings.	17.00
Mixed borings, turnings	20.00-21.00
Short shovel turnings..	22.00
No. 1 cast	30.00-31.00
Mixed cupola cast	26.00-28.00
No. 1 machinery cast..	38.00-39.00

SEATTLE

(Delivered consumer plant)

No. 1 heavy melting	*33.00*
No. 2 heavy melting	*29.00*
No. 1 bundles	29.00
No. 2 bundles	23.00
No. 3 bundles	19.00
Machine shop turnings	*14.00*
Mixed borings, turnings	*14.00*
Short shovel turnings	*14.00*
Electric furnace, No. 1	38.00-40.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	30.00-35.00
Heavy breakable cast.	30.00-35.00
Unstripped motor blocks	27.00
No. 1 wheels	38.00-40.00
Stove plate	26.00

Railroad Scrap

Rails, random lengths.	34.00-35.00

SAN FRANCISCO

No. 1 heavy melting	28.00
No. 2 heavy melting	24.00
No. 1 bundles	25.00
No. 2 bundles	22.00
No. 1 busheling	28.00
Machine shop turnings.	10.00
Mixed borings, turnings	29.00
Short shovel turnings..	29.00
Cast iron borings	29.00
Cut structurals	38.00
Heavy turnings	34.00
Punching & plate scrap	37.50
Electric furnace bundles	37.00

Cast Iron Grades

No. 1 cupola	39.00
Charging box cast	47.00
Stove plate	46.00
Heavy breakable cast	45.00
Unstripped motor blocks	41.00
Brake shoes	41.00
Clean auto cast	52.00
No. 1 wheels	47.00
Burnt cast	41.00
Drop broken machinery	52.00

Railroad Scrap

No. 1 R.R. heavy melt.	37.00
Malleable	55.00
Rails, 3-ft and under	42.00
Rails, 18-in. and under	45.00
Rails, random lengths.	39.00
Cast steel	40.00
Uncut tires	39.00
Angles, splice bars	42.00
Rails, rerolling	44.00

LOS ANGELES

No. 1 heavy melting	24.00
No. 2 heavy melting	20.00
No. 1 bundles	23.00
No. 2 bundles	20.00
Machine shop turnings.	8.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	37.00-40.00

HAMILTON, ONT.

(Delivered prices)

Heavy melting	$32.50
No. 1 bundles	32.50
No. 2 bundles	32.50
Mechanical bundles	28.50
Mixed steel scrap	28.50
Mixed borings, turnings	26.50
Rails, remelting	32.50
Rails, rerolling	41.50
Busheling	26.50
Busheling new factory:	
Prep'd	30.50
Unprep'd	28.50
Short steel turnings	22.50

Cast Iron Grades

No. 1 machinery cast	46.00-50.00

†F.o.b., shipping point.

SCRAP

for your every requirement

LURIA BROTHERS AND COMPANY, INC.

CONSULT OUR NEAREST OFFICE FOR THE PURCHASE AND SALE OF SCRAP.

MAIN OFFICE
LINCOLN-LIBERTY BLDG.
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CHICAGO, ILLINOIS LOS ANGELES, CAL. ST. LOUIS, MO.
CLEVELAND, OHIO NEW YORK, N. Y. SAN FRANCISCO, CAL.
SEATTLE, WASH.

LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Berman

QUANTITY PRODUCTION OF GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

ESTABLISHED 1866
THE WHELAND COMPANY
CHATTANOOGA 2, TENN.

EFFICIENT PICKLING WITH
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RODINE
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PICKLING ACID INHIBITORS

SAVES ACID
SAVES STEEL
SAVES MONEY

Use "RODINE" for improved pickling and increased production!

"RODINE" meets Government Specification No. U.S.N. 51-I-2.

Write for Descriptive Folder

AMERICAN CHEMICAL PAINT CO.
AMBLER, PA.

(Concluded from Page 129)

Wash., and miscellaneous, to Isaacson Iron Works, Seattle.

STRUCTURAL STEEL PENDING

4325 tons, 7 twin and 15 single bridge structures, Ohio turnpike, Cuyahoga county, Ohio; bids direct, fabricated and delivered, to Ohio Turnpike Commission, Columbus, Sept. 9; also 158 tons, expansion joints, contract M-6b.

3000 tons, Mountain Home, Idaho, air base hangars; general contract to Campbell Construction & Engineering Co., San Francisco.

2750 tons, state thruway work, Herkimer county, New York; bids Sept. 3.

1715 tons, six twin and eight single bridge structures, Ohio turnpike, Sandusky county, Ohio; bids direct, fabricated and erected, to Ohio Turnpike Commission, Columbus, Sept. 9, contract M-14A.

1100 tons, 224 trash racks, beams, etc., Chief Joseph dam; Western Steel Mfg. Co., Boise, Idaho, low $416,345.

750 tons, stores, Main Line Shopping Center, owner, and John Wanamaker, operator, Wynnewood, Pa.; bids Sept. 3.

335 tons (also 50 tons reinforcing), Washington state, Whatcom county bridge; bids to Olympia, Sept. 9.

329 tons, state bridge work, route 21, section 4-D, Essex county, New Jersey, bids Sept. 8; also 234 tons of reinforcing steel.

300 tons, high school, Sturbridge, Mass.

175 tons, alert hangar, airfield, Bedford, Mass.; George A. Fuller Co., Boston, low.

200 tons, addition to Hanford, Wash., plant; bids in.

150 tons, high school, Anchorage, Alaska; bids in.

Unstated, auto transformer structures, Coulee dam power plant; rebids in Aug. 25; June 4 bids rejected.

REINFORCING BARS . . .

REINFORCING BARS PLACED

100 tons, Seattle Pacific College, Seattle, and miscellaneous, to Northwest Steel Rolling Mills Inc., Seattle.

REINFORCING BARS PENDING

2000 tons, Navy oil storage tanks, Manchester, Wash.; bids to Aug. 25.

400 tons, Mountain Home, Idaho, air base, tanks, pipe line etc., Thorne & Marble, Seattle, low $1,172,817 to U. S. Engineer.

225 tons, Washington state girder overpasses, Thurston county; bids to Olympia, Sept. 9.

225 tons, Washington state girder bridge, Snohomish county; bids to Olympia, Sept. 9.

100 tons, including steel H-beams, spillway repairs, Fresno dam, Montana; bids to U. S. Bureau of Reclamation, Malta, Mont., Sept. 1.

PLATES . . .

PLATES PLACED

550 tons, tunnel shell, naval gun factory, Caderock, Md., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

PIPE . . .

CAST IRON PIPE PLACED

400 tons, system improvements, Cottage Grove, Oreg., to Pacific States Cast Iron Pipe Co., Portland, Oreg.

CIMCO MACHINE TOOLS AT BARGAIN PRICES

Niles 12' x ¾" Initial Type Bending Roll.
Acme 5R Universal Ram Type Turret Lathe.
Niles 36-44 Vertical Boring Mill.
King 42" Vertical Boring Mill, 2 heads.
King 52" Vertical Boring Mill, one plain and one swivel head on cross rail, DC motor drive.
Niles 42"-50" Driving Box Borer, Burnisher and Facer, late type.
Hall Planetary Style D Miller.
Gould & Eberhardt 96 H Hobber.
Norton 10 x 24 Surface Grinder.
Sellers 4T Tool Grinder, motor drive.
Sellers 6T Tool Grinder, late type.
Brown & Sharpe #12 Plain Grinder, reversing mechanism.
Heald #70A Internal Grinder.
Heald 42 Borematic.
Jones & Lamson 8 x 31 Thread Grinder.
Heald 72-A3 Plain Internal Grinder.
Lodge & Shipley 16" x 6' single pulley drive, 12 spindle speeds.
American 16" x 8', 3 SCD, 56" center distance, 1¼" hole in spindle.
Gould & Eberhardt 16" Back Geared Shaper.
Gould & Eberhardt 24" Back Geared Shaper.
Gould & Eberhardt 28" Shaper, gear box.
Smith & Mills 32" Shaper, gear box.
Fellows 725 Gear Shaper with Spur Guide
Fellows 612 Spur Gear Shaper.
Brown & Sharpe 3-26 Gear Cutter.
Oliver Template Tool Bit Grinder.
Lodge & Shipley 16" x 126" centers G.H. Lathe, Timken bearing, complete with taper attachment, late type.
Niles 48" x 48" x 16' Double Housing Planer, 4 heads, box table, DC reversible drive.
Landis 26" x 168" Plain Cylindrical Grinder.
American 30" x 14' G.H. Lathe, 12 speed.
Bliss #58 Drawing Press, 5" stroke.
Cincinnati #2 Centerless Grinder.
American 4'11" column Triple Purpose radial drill, motor driven thru Turner gear box on arm.
Gisholt 1L Saddle Type Turret Lathe, with bar feed, late type.
Milwaukee 2HL Plain Miller, late type.
Brown & Sharpe 3A Univ. Miller.
Libby International Rapid Production Turret Lathe, 26" swing x 7½" hole in spindle.
LeBlond 25/50 x 6/10 G. H. Sliding Bed Gap Lathe, 16 spindle speeds, Timken bearing.
Cincinnati #3 Hi-Power Plain Miller.
Niles 250 ton Hydraulic Wheel Press.
Niles 600 ton Wheel Press, 8' daylight.
Cleveland 30x30x10' Openside Planer.

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"GUARANTEED MACHINERY"
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CINCINNATI 26, OHIO

TWO NEW SULPHURIC ACID PICKLING TANKS

Inside Dimensions: 9'10" Long
9'10" Wide
6' 6" Deep

Inside of tank covered with 3/16" thick rubber, Neoprene type, cured in place. Can be furnished with acid proof brick, for immediate shipment. Located in—Southwest. Further details write:

FLORES, Box 120, Eagle Pass, Texas

FOR SALE
1—#6 HILLES & JONES VERTICAL OPEN SIDE BAR SHEAR. CAPACITY 3½" ROUNDS, INCLUDING 15 HP, 230 VOLT D.C. MOTOR. EST. WT. 50,000 LBS.
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Box, Steel Sheathed, 40-Ton Capacity
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Box, Single Sheathed, 50-Ton Capacity
Flat, 50-Ton, Steel Underframe, 40'6" Long
Gondolas, Composite, or All Steel 50-Ton and 70-Ton
Hoppers, Twin, All-Steel, 50-Ton, Cross Dump
Ore Hoppers, All-Steel, 50-Ton, Heavy Duty
Tank, 3,000-Gallon, High Pressure
Tank, 8,000-Gallon, Coiled and Non-Coiled

Hoppers, All Steel, 70-ton, Triple Hopper Cross Dump

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8,000 Gallon
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Capacity 27½ Tons
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Double Drums
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2 years abroad. Attractive salary, overseas differential, cost-of-living allowance. Transportation furnished for family.

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Penton Building Cleveland 13, Ohio

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AIR COMPRESSOR

INGERSOLL-RAND 2-stage Imperial Type, XCB, Horizontal, 9¾ x 12—15 x 12, 450-475 CFPM, 100# Press, complete with GE 100 HP Synchronous Motor, 3/60/220V 900 RPM also Exciter, Push Button Type Starter and Exciter Switch—Serial No. of Comp. is 57,000.

Entire equipment recently overhauled by former owners and offered in good operating condition throughout, available for PROMPT DELIVERY, offered subject to prior sale and customary used machinery terms, inspection at our warehouse.

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CLASSIFIED

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ASSISTANT MAINTENANCE SUPERINTENDENT—for large semi-integrated Eastern Steel Mill. Plate Mill experience preferred. Must be capable of initiating and supervising a Preventative Maintenance Program. M. E. an asset. Reply Box 800, STEEL, Penton Bldg., Cleveland 13, Ohio.

LUBRICATION ENGINEER—for large semi-integrated Eastern Steel Mill. Must have Steel Mill experience, and must be capable of initiating and supervising a Preventative Maintenance Program. M. E. an asset. Reply to Box 801, STEEL, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

PLANT MANAGER with 25 years' experience in Costs, Production and Management functions, M.I.T. graduate. Write Box 758, STEEL, Penton Bldg., Cleveland 13, Ohio.

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SALARIED POSITIONS $3,500 TO $35,000. WE offer the original personal employment service (established 43 years). Procedure of highest ethical standards is individualized to your personal requirements. Identity covered; present position protected. Ask for particulars. R. W. BIXBY, INC., 110 Dun Bldg., Buffalo 2, N. Y.

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One Direct Gas Fired, single compartment continuous conveyor type oven with forced circulation. Overall length of conveyor 44 ft. Production capacity approximately 3300 # Aluminum sheets per hour. Maximum operating temperature 600° F. Upon request we will be glad to send you full information and a picture.

ANDERSON & SONS, INC.—WESTFIELD, MASS.

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Must thoroughly understand welded steel fabrications and be capable of selling welded steel fabrications. Business contacts are helpful, however not essential. This position is an excellent opportunity for an ambitious and aggressive man who is interested in building an assured future with or without a college degree.

Replies held in strict confidence.

Our employees know of this ad.

Please relate all experience and details and present employer.

Write Box 803, STEEL
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Your exact trackage needs filled "Faster From Foster" Track Tools & Accessories are properly matched and fabricated to meet all requirements and shipped from a reliable source.

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PILING

All Lengths, Sections, all standard makes your job requires. Also Rent Pile Hammers, Pile Extractors.

TRACK ACCESSORIES • PIPE • WIRE ROPE

L. B. FOSTER CO.

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Chicago 4, Ill. Houston 2, Tex.

HERE ARE 2 ANSWERS TO YOUR PRODUCTION PROBLEMS!

Pangborn cuts costs, saves time

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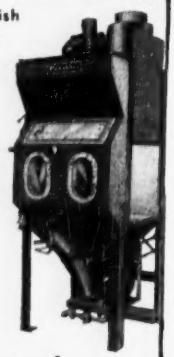
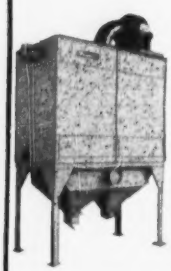


Pangborn Hydro-Finish Cabinet—Removes scale and directional grinding lines . . . holds tolerances to .0001" and prepares surfaces for painting or plating. Liquid blast reduces costly hand cleaning and finishing of molds, dies, tools, etc. Models from . . . **$1410** and up.

(2) Dust Control



Pangborn Unit Dust Collector—Traps dust at the source. Machine wear and tear is minimized, housekeeping and maintenance costs reduced. Solves many grinding and polishing nuisances and allows reclamation of valuable material. Models from . . . **$286** and up.

Pangborn Blast Cleaning Machines Portable model cleans structures, bridges, tanks, quickly and economically . . . $188 and up. Stationary cabinet saves time and money cleaning small metal parts . . . $319 and up.

Write for details on these machines to: PANGBORN CORPORATION, 1600 Pangborn Blvd., Hagerstown, Md.

Look to Pangborn for the latest developments in Blast Cleaning and Dust Control equipment

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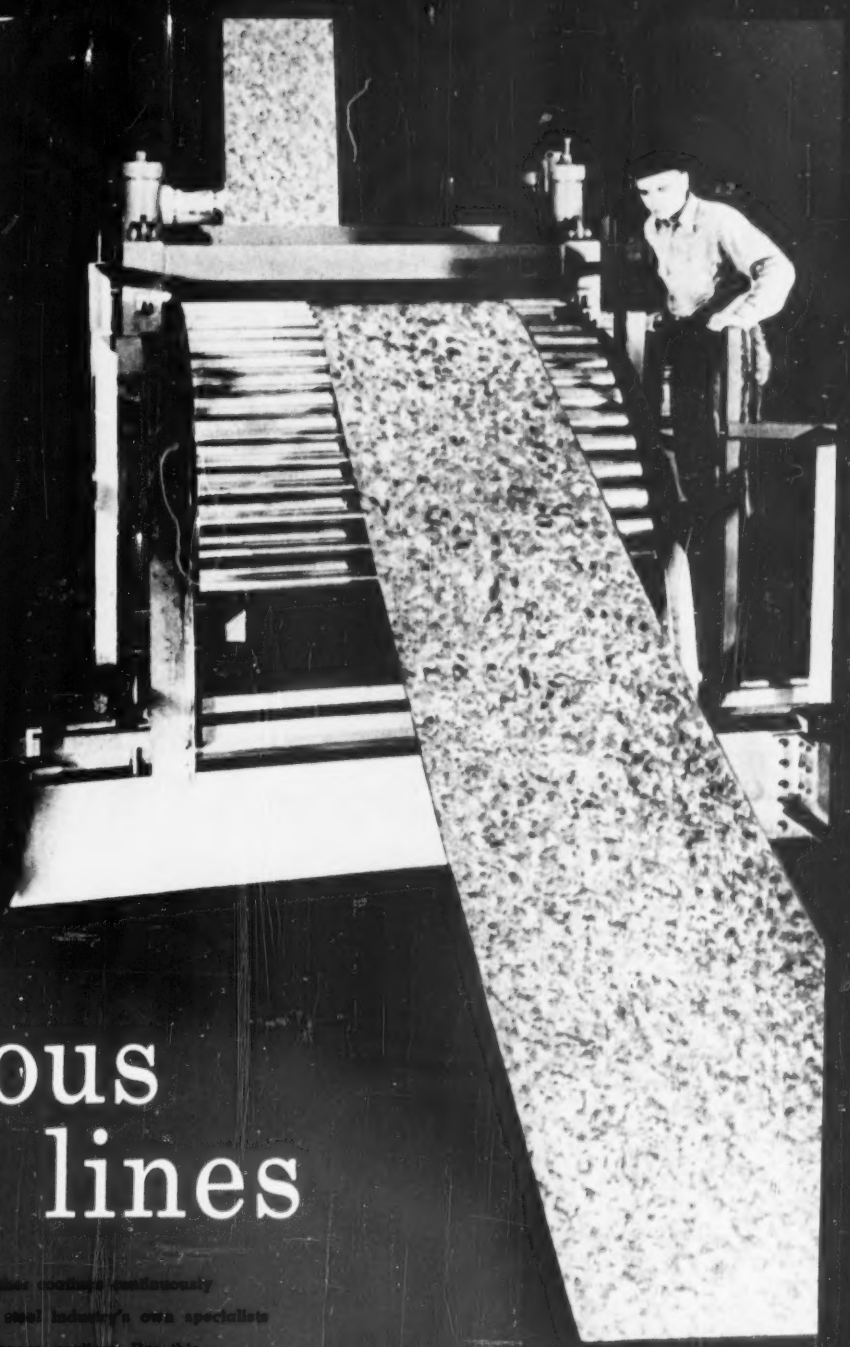
GOOD EQUIPMENT BRINGS DOWN PRODUCTION COSTS



continuous coating lines

The application of galvanizing, terne and other coatings continuously in coils has arrived. Aetna's engineers and the steel industry's own specialists have pioneered jointly in developing continuous coating. Use this experience and practical knowledge when you consider Continuous Coating Lines for your business.

In recent months, Aetna-Standard has completed four new galvanizing and terne lines for important steel companies. These installations include primary and auxiliary equipment.

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Aetna-Standard

PLANTS IN WARREN, OHIO • ELLWOOD CITY, PENNSYLVANIA

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M. Castelyi, Inc., New York, N. Y. — Mexico, Central and South America.

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Demag Aktiengesellschaft, Duisburg, Germany — Germany, Austria, Yugoslavia, Greece, Turkey, Egypt.

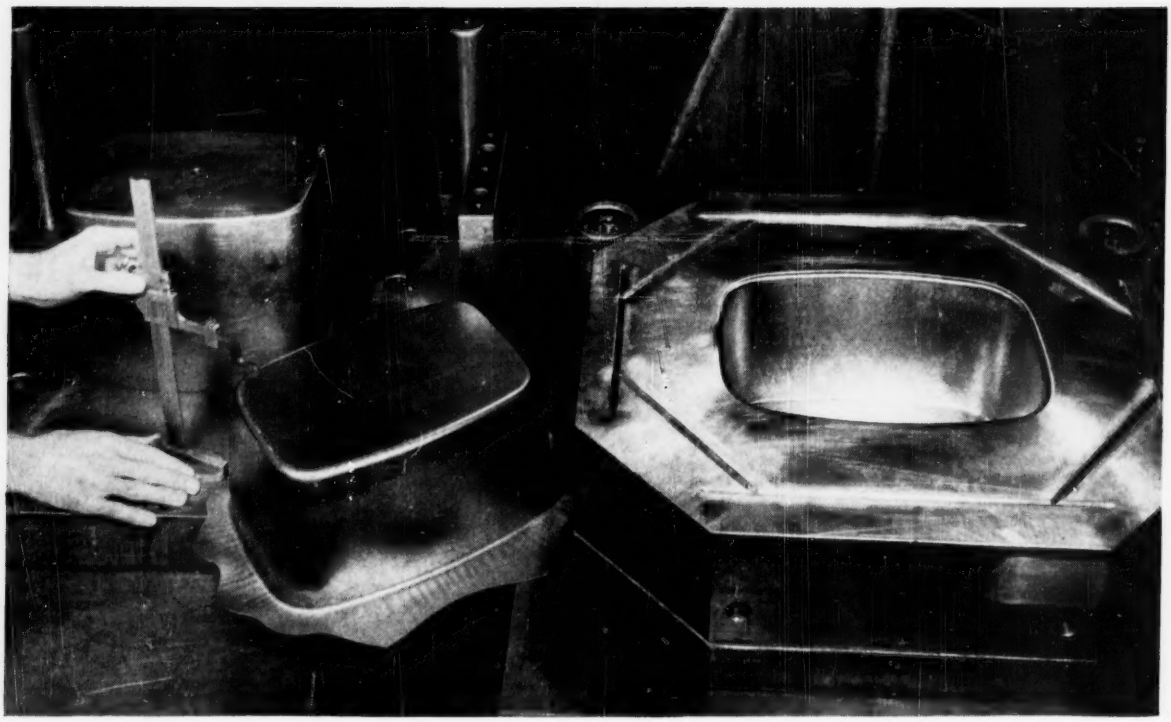
Compagnia Italiana Forme Acciaio, Milano, Italy — Italy.

Aetna-Japan Company, Ltd., Tokyo, Japan — Japan.

Hale & Kellgren, Inc., Akron, Ohio — Representatives of the Rubber Industry.

Designers and Builders to the Ferrous, Non-Ferrous, Leather and Rubber Industries

Graph-Mo® steel die draws contour shell 5⅞" deep without scoring!



TO keep production up and finishing costs down when deep drawing contour shells for home fryers, the Dickey Grabler Company, Cleveland, Ohio, uses dies made of Graph-Mo®—one of four Timken® graphitic tool steels.

Because of the free graphite in its structure, Graph-Mo has outstanding low-friction properties: minimum tendency to score, seize, scuff or gall. As a result, Graph-Mo dies make the difficult 5⅞" deep contour draw without scoring the stamping. Costly polishing before the chrome-plating operation is eliminated, die life increased.

Graph-Mo offers other die advantages, too. The diamond-hard carbides in Graph-Mo give excellent resistance to wear and abrasion. It responds uniformly to heat-treatment, permitting closer tolerances in the parts. It has good stability, and is easier to machine than ordinary tool steels.

For more helpful information on the four Timken graphitic tool steels and their uses in dies, punches, gages and machine parts, write for the 10th edition of "Timken Graphitic Steel Data Book". The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

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Fine Alloy
STEEL

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